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CANCER OF THE COLON AND RECTUM.*

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The Increase in Cancer

The importance of the fight against cancer is becoming more obvious every year. That the mortality rate from cancer is on a steady increase, aside from the allowances that may be made for more accurate diagnosis, is generally conceded. With the prolongation of life which Dublin indicates will continue for about twenty years longer, more and more individuals will be gradually thrust into the "tropic of cancer."

The organs that are chiefly responsible for deaths from cancer are the stomach and intestines. In the Registration Area of the United States in 1929, which is the last year for which we have a complete report of the United States Census Bureau, there were 111,569 deaths from cancer. The Registration Area represents 95.7 per cent of the total population of the United States. Allowing for this 4.3 per cent which are not included in the Registration Area, it will be readily seen that the total deaths from cancer in the United States are upward of 115,000. Of 111,569 deaths from cancer, cancer of the stomach and liver (which are classified together) is responsible for 37,915 deaths. Primary cancer of the liver is very unusual, so that the vast majority of the cancers in this classification are of the stomach. Cancer of the small intestines and colon accounts for 10,958 deaths, and cancer of the rectum and anus accounts for 5,018 deaths.

It will be seen that cancer of the stomach, liver, small intestines and large intestines is responsible for 53,891 deaths from cancer during the year 1929.

Cancer of the small bowel is quite rare, though it occasionally occurs.

The American Society for the Control of Cancer, an organization which is composed of both members of the medical profession and laymen and which is earnestly striving to decrease the death rate from cancer, recognizes only two methods of treating cancer—by radiation either with radium, radium emanations or X-ray, and by surgery. Surgery, of course, includes operations, whether done by a knife, the endotherm or the electric cautery. In some regions of the body radiation is preferable to any other treatment for cancer, as in the lymphosarcomas, or cancer of the uterine cervix. In some other regions a combination of radiation and surgery is best, as in certain malignancies about the mouth or cancer of the breast, while in still other regions surgery alone is the preferable treatment, as in cancer of the stomach and intestines. Occasionally in the rectum the implantation of radon emanations or applications of deep X-ray are helpful, but as a rule cancer of the colon down to the rectum and cancer of the stomach are best treated by surgical extirpation.

Diagnosis of Cancer of the Colon and Rectum

An important point in all types of cancer is an early diagnosis. Unfortunately this is often difficult, because of the absence of pain in the early stages of cancer. The symptoms of cancer of the colon usually differ somewhat in the right half and the left half of the colon, because of the difference in function of these two segments of the bowel. In the right half of the colon the fluids are largely absorbed, whereas the left half serves chiefly as a reservoir. The line of demarkation of these functions, however, is not sharply drawn, and there may be some adaptation of one function to the other.

One of the first signs or symptoms that attracts attention to the possibility of malignancy of the colon is an irregularity of the habits of the bowel. If the patient whose bowel movements have been habitually regular begins to

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have stools at unusual times, if there is some tenesmus, and the appearance of mucus and particularly of blood in the bowel movements, which are scanty and at irregular periods, attention should at once be drawn to the possibility of cancer, even if there is no pain. These cases should be examined, first of all digitally in the knee-chest position and then with a proctoscope. A careful digital examination of the rectum will enable a diagnosis to be made in a large majority of cases. This should be supplemented by a proctoscopic examination which will reveal some of the lower sigmoid, a location where a roentgenologic examination is not always satisfactory.

The frequent transition of benign tumors or polyps of the large bowel into cancer has often been noted. A large proportion of cancers of the rectum and lower sigmoid that can be observed by the proctoscope have as their starting point an adenomatous polyp. A solitary ulcer may result in sufficient irritation to initiate a malignant growth. In the right half of the colon cancer is usually large, ulcerating and non-obstructive, certainly until it becomes of sufficient size to be palpated. Occasionally in thin persons with relaxed abdominal wall a tumor can be felt in a comparatively early stage, though usually this does not occur until the disease is well advanced. After the ulcerated area has penetrated into the deeper coats of the bowel, the peritoneum over it becomes irritated and inflamed and pain results. This may be noted at defecation, and as it advances it gives rise to tenderness and muscle spasm. Apparently, however, pain except as it is caused by obstruction and the interference of peristalsis does not appear until the peritoneal coats are involved, at least from the hyperemia. In the right colon, there is a tendency for a malignant growth to become fungus-like, and necrotic and ulcerative, and there is ready bleeding with free absorption of the septic and necrotic products of the cancer. Consequently, a secondary anemia is readily produced by cancer in the right colon. A secondary anemia, or even an anemia that closely resembles a primary anemia, should always call attention to the gastro-intestinal tract, as it is often caused by a benign tumor in the stomach or duodenum, a slowly bleeding ulcer, or by cancer in the right colon. It was thought at one time that cancer in the right colon produced some particular substance that was hemolytic. It has been shown, however, that this is not true, and that the anemia can be readily accounted for by the oozing and by the hemolytic effects of necrotic products from the colon. Obstruction is not common from cancer of the right colon.

In the left half of the colon, the cancer is usually the so-called "napkin-ring" or constricting type, and often causes obstruction. Colicky-like pain may appear at intervals for some time before complete obstruction occurs, or total obstruction may produce the first symptoms. Palpation of the tumor on the left side is not so easily accomplished as on the

Fig. 1.—Mr. R. M. R. Excision of cancer of the sigmoid with end-to-end union. The patient was operated upon April 1, 1929. There has been no recurrence up to the present. This shows not only constriction but somewhat more abundant papillary-like formation that often occurs in cancer of the left colon.

right side, for the reasons that a tumor in the right colon is more likely to be of the fungous ulcerative type and the redundant loops of sigmoid may obscure the growth. A careful abdominal palpation, however, should always be made, particularly along the line of the colon. (Figs. 1 and 2.)

Roentgenologic examination with a barium enema is valuable in the diagnosis of tumors of the colon, and it is much more helpful in the diagnosis of tumors in the upper sigmoid and the rest of the colon than in the lower sigmoid and the rectum. If the sigmoid is very redundant and if it falls over the lower sigmoid, it may not be possible to show a filling defect.

Fig. 2.—Photomicrograph of specimen shown in Fig. 1. It is an adeno-papillary type of carcinoma, of about grade 2 malignancy. (X 140.)

It must be borne in mind, however, that when an irregularity of the contour of the lumen of the colon can be demonstrated by the X-rays the growth is already fairly well advanced.

The first thing to do when a patient presents the signs of a change in the bowel habits and particularly if there happens to be a little blood in the stools or a passage of blood or mucus between the stools, is to make a general physical examination. This includes laboratory examination for syphilis and a study of the blood along, of course, with the routine examinations of the heart and lungs. Then the abdomen should be carefully palpated with particular attention paid to any unusual prominence in the abdomen and to any mass or tender spot that may be palpated. Next, the rectum is thoroughly examined with the finger, and finally a proctoscopic or sigmoidoscopic examination should be made. If these do not show any definite cause for the complaint, a barium enema is given and careful X-ray examination is made by a competent roentgenologist. Even the best roentgenologist may find difficulty in making a diagnosis of lesions of the lower sigmoid, and if one is tried by one who is incompetent the situation is quite hopeless and such an examination may cause more confusion than if it had been omitted. A barium enema is preferable to examination of the colon after the ingestion of barium through the stomach, because by the latter method the colon is usually not well filled out and is not under the tension that an enema produces. If a barium enema shows no lesion in the colon, then a thorough gastro-intestinal X-ray examination should be made because there might be some defect around the ileo-cecal valve which will show better by the method of oral administration.

Cancers of the colon are among the most satisfactory types of internal cancer to treat. In a report of the Cured Cancer Clinic held at Boston April 5 and 6, 1932, the following are suggestions of the symptoms and methods of investigation:

Suggestive Symptoms:
- (a) Rectal bleeding.
- (b) Any change in bowel habits.
- (c) Intestinal grippe.
- (d) Colitis
- (e) Unexplained secondary anemia.

Methods of Investigation:
- (a) Careful examination of abdomen, pelvis and rectum.
- (b) Proctoscopy.
- (c) Barium enema only after rectal examination and proctoscopy have been done.
- (d) Barium meal only after (a), (b), (c), as above are negative.
- (e) Examination of stools for blood.

Results of Treatment

Many cases reported at this Boston Clinic were too far advanced to admit of any operation. Of the cases to be operated upon for cancer of the rectum there were 55 per cent of five year cures, and of the colon there were 19 per cent of five year cures.

At the request of the American College of Surgeons, we have reviewed our cases of cancer of the rectum for the years 1924, 1925 and 1926, so that there is an interval since the last operation of more than five and a half years.

The group was not large, but as each patient was traced it seemed to be valuable. There were eleven cases of cancer of the rectum presented for treatment during those three years, and of these three were inoperable and eight were operated upon, with no operative deaths, though in the subsequent three years the operative mortality was about 30 per cent. Of the eight patients operated upon, three have died from recurrence and four are now living and well, five to eight years after operation. One patient died three and a half years after the operation of intestinal obstruction due to adhesions about the cecum, and necropsy showed no recurrence of the cancer. If this case be excluded, we have four cases cured from five to eight years after operation out of seven cases, or 57 per cent of five year cures.

In cancer of the colon, unfortunately, our statistics are not satisfactory because we had no standard operative procedure at that time for cancer of the colon such as we have adopted within the past few years. The method of the so-called antiseptic technic of Kerr, by folding in the tissues with a basting stitch, has proved to be fallacious because the basting stitch practically always becomes to some extent infected and because the bowel has not been biologically prepared for the operation. In somewhat the same general way the biologic preparation of the patient is necessary in exophthalmic goiter, for instance, by giving iodine; or for the urological case by draining the bladder and relieving the pressure on the kidneys before operation is undertaken. Lack of preparation for operation on the colon has caused an unnecessarily high death rate from cancer of the colon.

Treatment of Cancer of Left and Transverse Colon

For the past four years we have adopted methods of operation for cancer of the colon that seeem to be more satisfactory. If the lesion is in the transverse or left colon or sigmoid, where an anastomosis can be made, the first step of the procedure is a colostomy on the right side. This is accomplished by following the old-fashioned technic of bringing the colon onto the abdominal wall. A muscle-splitting incision as for appendicitis is made. The cecum is recognized and drawn up. If the mesentery of the ascending colon is short, the outer leaf is divided until the ascending colon is readily brought onto the wound. Then a glass rod is passed through the mesentery of the ascending colon and fastened to the abdominal wall with sutures. The bowel is packed around with iodoform gauze. If there is an obstruction, a purse-string suture is applied through a portion of the bowel on the oral side of the rod and a soft rubber catheter with an additional perforation is inserted through the purse-string suture. This drains off the gas and prevents contamination of the wound for a few days. After a few days the wound is opened widely on the proximal side of the glass rod and all of the fecal matter comes through the artificial anus. The distal end of the bowel is irrigated by washing it out with salt solution twice a day. In this way the distal portion of the bowel is given complete rest and the quantity of bacteria is greatly reduced. It converts the distal part of the colon to the same bacteriological condition as the upper part of the small intestine, which can be safely sutured from within. About ten days or two weeks after the establishment of the artificial anus the segment of diseased bowel is removed.

If the patient is fat and the mesentery short, or if the cancer is large and adherent, a modified Mikulicz operation is done. The mesentery of the segment of bowel to be removed is doubly clamped in segments, divided and tied just as though the bowel were to be resected. Each end of the loop to be removed is doubly clamped with Payr clamps and brought onto the abdominal wound. The two limbs of the bowel that are grasped by the clamps are sutured together by parallel lines of sutures in such a way that the large mesenteric vessels will not be included in the apposed portions of the bowel; otherwise, when the spur is later divided the nutrition of the bowel may be affected. The loop of bowel, each end of which has been doubly clamped, is then divided between the clamps with the electric cautery. The wound is partly closed, and iodoform gauze is packed around the margin of the wound. If the cancer has been adherent, and particularly if it has been septic, cigarette drains and tubes are carried down to the stump of the mesentery. These are removed in two or three days, but the clamps on the ends of the bowel are kept in position until at least two days after the drainage has been removed. Occasionally the clamps will cut through before the desired time, but if the enterostomy

is functioning satisfactorily they will usually hold.

When the clamps on the bowel are removed, say in five or six days after the operation, the spur between the two ends of the colon, which was formed by placing parallel lines of sutures, is clamped, preferably with a soft-bladed clamp that comes together at the tip first. This is inserted well down into the bowel on each side and lightly locked. After twenty-four hours it is clamped more firmly, but by lightly locking it at first it is fixed in position and then all of the bowel that is caught within its grasp later on will become necrotic. The clamp should be left on until it comes away of itself, which occurs in three or four days. The ends of the bowel may then be turned in by a simple procedure under local anesthetic, with sutures of catgut, but they should be permitted to heal firmly before the enterostomy is closed. This will take at least two weeks. The enterostomy is closed by first removing the glass rod the day before the operation is to be done, and after thoroughly cleansing the wound the margins of the opening are brought together with catgut sutures in such a manner as to invert the mucosa. This may produce some tension, but it is necessary to invert the mucosa fully. This line of sutures is further buried by another row of interrupted mattress sutures of fine tanned or chromic catgut, the ends of which are left long. The incision around the enterostomy is extended. The peritoneal cavity is opened, and the loop of bowel is thoroughly mobilized. It is sunk into the peritoneal cavity. The long ends of the mattress sutures are threaded in needles and passed through the peritoneum of the upper margin of the wound and tied. This brings the sutured surface snugly in apposition with the parietal peritoneum, and even though there is tension on the sutures the parietal peritoneum quickly seals off the wound. The abdominal wound is closed in layers after the manner of a McBurney incision, but a drain of rubber tissue is carried down to the bowel because these wounds usually suppurate, though it is rare for a fecal fistula to occur. If a fecal fistula does occur it readily closes after several days.

If the growth is of the constricting type and not adherent, an end-to-end anastomosis can be done. When the loop is to be resected, the mesentery should be cut back along its junction with the bowel until a spurting vessel is found. If this is not done, even with the greatest care it will be occasionally found that unconsciously the vessel supplying the portion of bowel to be resected has been occluded. The bowel is cut obliquely, to prevent constriction of its lumen. First of all is applied a row of internal sutures of non-absorbable material—linen or silk—and making an over-hand stitch or lock-stitch uniting the mesenteric third of the bowel. This line of sutures is inserted as far as possible from within. Over this are placed mattress sutures of fine or chromic catgut, and the ends are left long, threaded in a needle and passed through adjacent fat, either omentum or tags of mesentery, and tied, so assuring additional safety. The mesentery is carefully adjusted not only to cover the raw surface but care must be taken also to avoid injuring the vessels that supply the bowel. The blood supply to the colon is normally meager, and injury of a small vessel may cause necrosis and leakage.

Treatment of Cancer of Right Colon

In the right half of the colon the procedure is quite different, because the function is different. In cancer of the cecum or ascending colon there is no room for the establishment of an enterostomy in the large bowel, and an enterostomy in the ileum is not satisfactory, because, among other reasons, the liquid contents of the bowel would continually contaminate the wound where the resection is to be made later on. The ileum is, therefore, divided four or five inches from its termination, between two clamps, with the electric cautery, each end being thoroughly sterilized. If the operation is to be in two stages, the distal end is buried by a basting stitch. Whether the operation is in two stages depends upon the local conditions. If the mesentery is short or the growth is large and adherent, a two-stage operation should be adopted. If the growth, however, is not adherent or the mesentery is ample, the operation may be done in one stage. If it is a one-stage procedure, there is no occasion for suturing the distal end of the ileum. A small rubber band, No. 32, three inches long and one-eighth inch wide, is placed through the mesentery of the ileum about six to eight inches above the clamp. This is tied three times. (Fig. 3.) The portion of the transverse colon to which the bowel is to be applied is blocked off by the small rubber bands. These rubber bands are superior to soft-bladed clamps; they not only take up less room, but

are more effective and less injurious to the bowel.

The end of the ileum is brought to the side of the loop of transverse colon to which it is to be anastomosed, and fastened by suturing

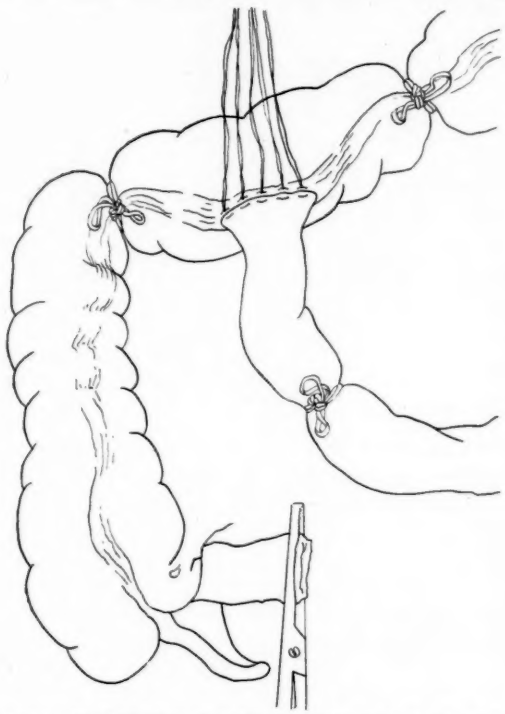

Fig. 3.—The first stage in excision of malignancy of the cecum or ascending colon. The small rubber bands as referred to in the text have been placed on the ileum and also on the colon. The ileum has been doubly clamped near its end and divided with the electric cautery. The stump of the ileum has been cleaned out and sutured end-to-side to the transverse colon. The cecum and ascending colon may be removed at a later stage or, if the growth is small and the mesentery ample, this can be done immediately after the end-to-side anastomosis has been completed.

the under surface of the ileum to the side of the colon near its mesentery with linen or silk sutures. First two stitches are placed as tractor sutures, one on each side of the ileum, uniting it to the colon, and then a continuous mattress suture of the same material makes the union firmer. The site of the anastomosis is well packed off with gauze wet in salt solution. The Payr clamp is removed and the segment of bowel from its stump to the rubber band is thoroughly cleaned with strips of gauze which have been soaked in mercuric iodide solution. An incision is made in the transverse colon, preferably through a band of the colon, and the loop of transverse colon which has been isolated by the two rubber bands is thoroughly cleaned. Beginning on the right side the posterior margin of the stump of the ileum is united to the posterior margin of the wound in the colon with a continuous suture of linen or silk. When the left side is reached, an incision is made in the anterior surface of the ileum to flare it open. The suture is continued anteriorly, preferably from within as far as possible, and tied to its original end. The anterior row of sutures of linen or of silk is then applied, and over this anteriorly and laterally is placed a series of interrupted mattress sutures of fine tanned or chromic catgut. The ends are left long.

If the operation is in one stage, the mesentery of the terminal portion of the ileum, the cecum and ascending colon should have been already divided in segments and tied. All that remains to be done is to clamp doubly the transverse colon near the site of the anastomosis and to divide it with the electric cautery between the clamps. The stump is buried by the basting stitch method, reinforced by a purse-string suture, and over this is brought some adjacent peritoneal covered fat. The long ends of the suture on the end-to-side anastomosis of the ileum to the colon are also carried through peritoneal covered fat to protect it in the same way. If the operation is to be in two stages, the distal stump of the ileum is buried and the cecum and ascending colon are removed about two weeks later.

Treatment of Cancer of Rectum

In cancer of the rectum there is not the same need of an enterostomy. The operation can usually be done in one stage, by the abdomino-perineal method. Except in unusual cases this is the best procedure. With the continuous intravenous administration of dextrose in Ringer's solution, using spinal anesthesia, this operation can be performed in one stage when formerly it required two or more stages. When the spinal anesthesia is given, the intravenous injection of dextrose and Ringer's solution should be started, preferably through an intravenous cannula. An incision is made in the peritoneum around the lower sigmoid, the inferior mesenteric vessels are divided and tied, and the rectum is mobilized by dissecting it first from the sacrum and then laterally and anteriorly. The lower sigmoid is divided with a cautery between two clamps, the clamp on the upper end being inserted through a short incision to the left of the main incision, and

the stump is drawn through for the artificial anus. The lower end is closed with sutures and dropped into the pelvis, and the peritoneum is sutured over it. The anus is closed with a stout suture and the operation is then completed from below. The rate of flow of the intravenous injection may be increased if the patient appears to be shocked during the operation. At the end of the operation, if the shock is marked a transfusion of blood is given, from a previously matched donor, through the intravenous cannula for the dextrose in Ringer's solution. In this way the operation may be done in one stage, so avoiding the dangers of infection and of transplanting or spreading the cancer cells while waiting for the second stage. (Figs. 4 and 5.)

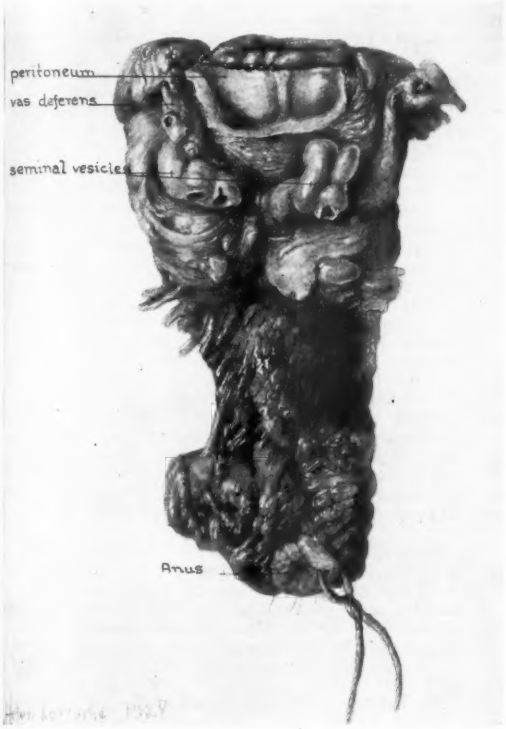

Fig. 4.—Mr. C. F. E. The patient was operated upon on October 24, 1924. An exploratory operation and sigmoidostomy had been done four months before this at a large Northern hospital. The growth had seemed inoperable but some radon implants were inserted. I operated removing the rectum together with a portion of the prostate and the seminal vesicles. The operation was very extensive, and much of it was done with the cautery. The patient was quite ill for several days and required a transfusion of blood, but eventually recovered. He died February 17, 1928, from obstruction developing as a result of adhesions around the appendix, three years and four months after the original operation. A thorough post-mortem examination showed no trace of any malignancy.

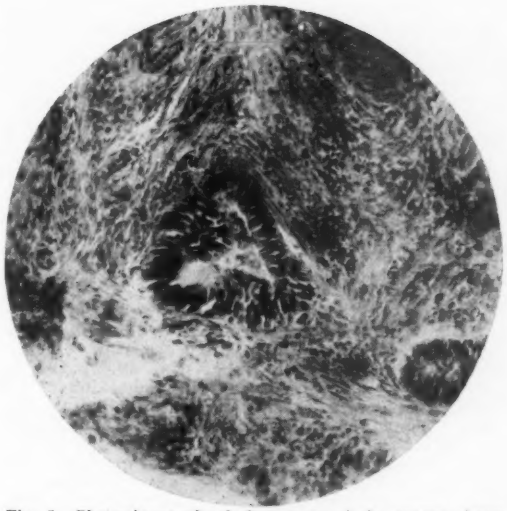

Fig. 5.—Photomicrograph of the cancer of the rectum shown in Fig. 4. The cancer cells are distinct but fairly well differentiated. There is much surrounding connective tissue, probably due to the radon implants. It can be classified as not higher than grade 2. (X 150.)

Discussion

Dr. Edwin P. Lehman, *University:* Dr. Horsley's presentation of this extremely important subject is of interest to all of us. He put considerable stress on the matter of early diagnosis, which is, I think, the phase of this subject of primary importance. Dr. Horsley quoted some figures presented at the so-called Cured Cancer Clinic which was held in Boston last spring. This meeting was held simply to demonstrate what the present methods of treatment of cancer can accomplish. The figures are worth everybody's study. In addition to the percentage of five-year cures quoted by Dr. Horsley, these figures also demonstrate the importance of early diagnosis. In quoting the following data, by the term cure a five-year period of freedom from symptoms is meant. In the total series of cases of cancer of the colon, 10 per cent were cured. In those cases classified as operable, the rate of cure was 19 per cent. In those cases classified as early, the rate goes up to 49 per cent. Similar differences occur in the cases of cancer of the rectum. The cure rate of the whole series was 23 per cent; of the operable cases, 55 per cent, and of the early cases 65 per cent. These figures, of course, represent an enormous difference in chance of life to individuals suffering from cancer of the large bowel if they can be brought to radical treatment early.

The problem as it is presented to the practicing physician is, of course, an extremely difficult one. The early symptoms of cancer of the large bowel are so close to normal variations of bowel habit and to the little aches and pains that everybody expects to have from time to time, that it is small wonder perhaps that relatively few cases come to operation early.

As an illustration of this fact, I may perhaps be excused for quoting some instances which I have presented before. In an unselected series of ten cases of carcinoma of the colon that came to the University of Virginia Hospital, six entered with definite obstruction. In these six cases the earliest symptoms elicited were as follows: (1) obstruction; (2) constipation after a lifetime of normal habits; (3) a sense of fullness after eating; (4) constipation followed by diarrhea; (5) irregularity of the stools and blood in the

stools; (6) black stools. Of the remaining four cases, one had had several attacks of obstruction and presented with a mass. One case was supposed to be appendicitis. One case was that of a girl known to have pulmonary tuberculosis, who had had three attacks of diarrhea with blood in the stool and was supposed to be suffering from tuberculous enteritis. The last case had simply a history of desire to go to stool without defecation.

Many of these presenting symptoms are in themselves not particularly striking. One would not be disposed to lay much stress upon them unless one is on the alert for this disease. Perhaps the most important point to make is that these symptoms have been persistent enough or troublesome enough to bring the patient to the doctor.

One wonders if the problem of the cause of the anemia which occurs with these right-sided tumors is solved. Dr. Horsley presented one view which is widely accepted, the view that it is due to the absorption of toxic products in the right side of the bowel. Many cases present an anemia which is close to the primary type and, in that respect, resembles the nutritional anemias which are being more frequently recognized. This makes us wonder if the anemia may not be due to faulty alimentation consequent to imperfect absorption or digestion, or both, which in turn is due to the mechanical presence of the tumor.

In regard to the technical aspect of Dr. Horsley's paper, I should like to say a word or two. I quite agree with him in regard to the illusory nature of asepsis in the so-called aseptic anastomosis. There is almost certainly contamination of any suture passed into the large bowel wall. One cannot accurately place it with assurance that it does not enter the lumen. It is improbable therefore that any anastomosis is truly aseptic. The increased difficulty of technical procedure and the increased uncertainty of a technically satisfactory union in these relatively blind methods must have great weight. Unquestionably the least septic form of anastomosis is the anastomosis done by ordinary methods in a bowel which has been properly prepared by the total diversion of the fecal stream. This method Dr. Horsley has frequently and ably emphasized

The mortality rate of the radical operation for cancer of the large bowel is almost bound to be high. Dr. Horsley is greatly to be congratulated upon the figures that he has presented. In the long run the operative death rate runs from 12 to 20 per cent, or even higher. This is a tremendous handicap for the surgeon at the outset, affecting materially the five-year cure rate. The possibility, however, of improving the five-year cure rate by radical surgery entirely justifies the risk. The surgeon, while endeavoring to lower his operative mortality by the sound methods presented, must, however, accept a large operative risk as part of the conditions of the problem, and the physician who makes the preliminary diagnosis must accept it as well.

DR. R. L. PAYNE, *Norfolk:* I was much interested in Dr. Horsley's paper. I think just one phase of this discussion probably has not been emphasized enough. Dr. Horsley very aptly said that these patients should be prepared biologically, meaning, I think, that their intestinal canal should be prepared for the operative procedures which the patient has to undergo. Now, there seems to be a very hazy understanding by the average surgeon as to how he is going to put the patient on a diet that will be free from residue—that is, how to put him on a residue-free diet. I thought it might be of interest to relate our custom. First, before the colostomy is done (unless it is an acute obstruction), the patient is put on a residue-free diet which consists of nothing but hard candy, such as you buy in jars in the drug stores, pitcher after pitcher of lemonade and orangeade, and absolutely nothing else. First, you get a clean bowel. Then, feeling you have an absolutely clean bowel, you do the colostomy.

After the colostomy, stop the candy and the orangeade and water by mouth, except a little ice to moisten the mouth, and put them on 10 per cent intravenous glucose. The longer you can carry the patient on 10 per cent intravenous glucose, before the colostomy is opened, the better he will get along, up to ten days. After the colostomy is opened the patient is made to get up and around for a few days and is put on a general diet, and then the primary resection is done. My mortality has been less with the two-stage operations.

Bear in mind—five or six days of lemonade and candy; six to ten days of intravenous glucose, if possible; then up and around for a week or ten days, on general diet; and then resection.

DR. CLAUDE MOORE, *Washington, D. C.:* I should like to say just a word, along the same line, that is, about the preparation of the patient before the X-ray examination. If more patients were prepared, as Dr. Payne has described here, for two days before the X-ray examination, more diagnoses could be made by the roentgenologist. Roentgenology is such a new field that the roentgenologist has not reached the same degree of perfection as the surgeon. Surgeons know that cancer of the colon frequently has only one leading symptom, secondary anemia; and they are sending patients for X-ray examination for the suspected cancer. Frequently a patient comes with the large bowel filled with fecal material. We cannot tell a bolus of fecal material from a tumor mass unless we can move it up and down the bowel. Many of them have only a physic before the X-ray examination; sometimes an enema. In that type of preparation you are not cooperating with the roentgenologist.

DR. HORSLEY, closing the discussion: The cases reported by Dr. Lehman illustrate very forcibly the difficulty of the diagnosis of cancer of the colon.

I recall a case referred to me with a diagnosis of appendiceal abscess in which I concurred. I found that there was a large fungus-like cancer in the ascending colon with much necrotic material and local peritonitis.

The diet which Payne has mentioned and which has been advocated by Rankin and Bargen, in which only fruit juices and carbohydrates are given in order to reduce the bacteria in the colon, often serves an excellent purpose. However, it is not a well balanced diet, and after a few days these patients with cancer of the colon, who usually have low resistance, do not maintain their general health as well as they would with a properly balanced diet.

In all cases of malignancy of the transverse and left colon down to, but not including the rectum, I do a preliminary colostomy through a muscle-splitting incision on the right side, as has been described. Ten days or two weeks later, the cancerous bowel is resected. The portion of the colon distal to the enterostomy is given a complete rest, because the glass rod is so arranged that all of the fecal matter is shunted through the enterostomy opening. In this way the bacterial contents of the distal colon are much more quickly and effectively reduced than by any diet which would permit the fecal matter, even though small in amount, to pass over this portion of the colon. In addition, the patient can receive a better balanced diet than merely carbohydrates and fruit juices, and his strength can consequently be restored more rapidly.

It is important to be on the lookout for anemia,

which is a frequent symptom of cancer in the right colon. If the cancer is in the right colon and is rather extensive, the operation as indicated in the paper had best be done in two stages. First an anastomosis between the terminal ileum and transverse colon is made, and later the cecum and ascending colon are resected. When the ascending mesocolon is pendant and the tumor small, it may be possible to do this in one stage.

The points of diagnosis have been emphasized in the paper. Patients in whom there is a secondary anemia without obvious cause should be suspected of having a slowly bleeding tumor or ulcer in the stomach or duodenum, or cancer in the right colon. A passage of blood from the rectum should demand a rectal examination. A careful digital examination can detect the great majority of cancers of the rectum. This should be made with a rubber glove, and not a finger-cot. With a finger-cot the surgeon may unconsciously have some inhibition about putting his finger in too far, which is absent when his whole hand is protected with a rubber glove. A careful digital examination will often avoid the tragedy of having cancer of the rectum treated for months for simple hemorrhoids, while the malignancy is gaining headway.

RECENT PROGRESS IN PROSTATIC SURGERY.*

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Slightly more than a century has elapsed since the hypertrophied prostate was recognized as the chief causative factor of urinary obstruction in the aged male. The development of prostatic surgery may be roughly divided into three distinct periods:

1. The nineteenth century.
2. The first twenty-five years of the twentieth century.
3. The last seven years.

By way of review, I will ask your indulgence while I give a synopsis of these periods and with especial reference to the last two.

Sir Everard Home, in his monograph, was the first to promulgate clinically the relation between the hypertrophied prostate and urinary obstruction. Since that time surgeons began to devise means, devices and approaches with which to attack the prostate and its accompanying distressing symptoms. Because of the work of the medieval lithotomists the perineal route was the first selected, but with only partial removal of the prostate.

In 1876-78 an Italian, Bottini, employed a thermocautery to the prostate through the urethra. In 1882 Leisrink used the suprapubic route. During the last decade of the nineteenth century prostatic surgery, like general surgery, made great strides and there developed warm controversy between the protagonists of the perineal and supra-pubic operations. Thus was the state of affairs at the end of our first period.

With the dawn of the twentieth century Freyer, of England, and Fuller and Young, of America, attacked the prostate and perfected operations, which for twenty-five years were considered standards. I dare say that no one will ever improve upon Young's perineal prostatectomy, but the suprapubic operations of Freyer and Fuller have been improved. In these operations the whole gland was enucleated, in contrast to the partial removal of the hypertrophied tissue by their predecessors. During this time when total prostatectomy was in vogue the operation was attended by a very high mortality. Now we know that this was due to "renal insufficiency" because of the lack of renal decompression and preoperative preparation. During the following years, with the advent of the kidney function tests, the blood chemistry estimations, the preoperative phase was found to be just as important as the operation itself. The mortality was again greatly reduced with the gradual adoption of these tests; the suprapubic or urethral decompression, the cardiac estimation and treatment, and the postponement of the operation until operability.

These biological principles were the greatest advances in prostatic surgery from 1900 to 1925. Vasectomy and vaso-ligation also made their appearance during this period and greatly reduced the morbidity. Still prostatic surgery was attended with distressing morbidity and mortality. Practically every one in this audience can recall the suprapubic prostatectomy of five or ten years ago. It was an unscientific, blind, digital enucleation of the gland. This procedure had many complications in its wake. There apparently was no regard for hemorrhage, which was only controlled by trusting God, the inflated bags of Hagner and Pilcher, or gauze packed in the ragged prostatic cavity. You are also familiar with the inefficiency of these methods of controlling post-operative hemorrhage at times. Generally, the index to the prognosis was in proportion to the post-operative hemorrhage. No doubt you are also familiar with the long tedious hospitalization, with the gradual healing and leaking suprapubic wound and the sufficiently soaked and exhausted but brave

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old man, who had by this time truly reverted to his ancestrial amphibian stage.

The last seven years have yielded many important developments in the suprapubic prostatectomy. The next forward step was the approximation of the edge of the prostatic capsule and the torn urethra following glandular enucleation in contrast to the old packing method. Deaver, in 1928, reported this repair of the urethra. S. Harry Harris, of Australia, in 1928-29 reported a large series of primary closure of the suprapubic incision following the removal of the gland. The enucleation was done under direct vision with scissors, the bleeding points were sutured and the urethra reformed by suturing the hinder part of the prostatic capsule to the remaining urethra. By doing this, the raw surface of the prostatic cavity was obliterated. The bladder was drained through the urethra and the suprapubic wound closed primarily.

Lower had been closing the bladder after removing calculi and proceeded to do this following prostatectomy. To Judd belongs the credit of instrumental enucleation of the prostate in the manner of the modern tonsillectomy. He also sutured the remaining capsule and drained the bladder through the urethra. Because of the excellent work of these men, the advances in suprapubic prostatectomy may be summarized as follows:

1. Visualized digital or instrumental enucleation of the gland.
2. Immediate arrest of hemorrhage by ligation or suture of the capsular bleeding points.
3. Suture of the capsule to reduce the raw surface and repair the prostatic urethra.
4. Primary closure of the bladder and suprapubic wound with drainage through the urethra per catheter.

This summary brings us to the last phase of prostatic removal, i. e., transurethral partial resection.

In 1878, as mentioned before, Bottini first used the thermo-cautery to relieve prostatic obstruction. This blind and dangerous procedure was soon abandoned. Much later Young devised the "Young punch" for removal of median bar obstructions. This served its purpose, but many times uncontrollable hemorrhages followed. John Caulk deserves the credit for the improvement of the "Young punch," and was able to relieve prostatic obstructions in about 85 per cent of all cases. Stern and Collins each produced a resectoscope, but, like all the others, the cutting and coagulating currents had not been perfected. Later, McCarty and Davis made improvements upon these and today we have a very useful and satisfactory instrument. It seems that surgery, like the progress of industry, is approaching the electrical age.

The present electro-surgical units consist of a sheath, which is placed through the urethra and into the bladder and through which the working parts are manipulated. The essential working parts are the loop electrode and the vision telescope. The other electrode is usually placed in contact with the patient's buttocks. Under full view, the electrode loop is brought in contact with the portion of the offending prostate, and, with the activation of the "cutting" current, small portions of the gland are removed in longitudinal sections. If bleeding occurs the foot switch changes the current from the cutting to coagulating, which controls the hemorrhage. This procedure is repeated until at least three-fourths of the prostate is removed. Davis claims that 90 per cent of all prostatic obstructions can be relieved in this manner. Immediate and secondary hemorrhage from the inevitable slough are the recognized dangers. Not sufficient time has elapsed to justify the percentage of recurrences. It is, however, a most valuable advancement and is especially suitable in median bars, hypertrophied middle lobes and malignant prostates. It is only a partial prostatectomy, but relief is afforded, morbidity and mortality are greatly reduced and hospitalization is more than cut in half.

Lastly, with the present-day development of sacral and spinal anesthesia, the removal of the prostate, or parts of the prostate, by any method has been greatly facilitated. These seem to be the anesthetics of choice.

With the recent advance in the technique of the suprapubic operation as above described, the development of the transurethral partial resection of the prostate in selected cases and the use and knowledge of sacral and spinal anesthesias, prostatic surgery has become modernized and can now be called operations of precision.

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DISCUSSION

DR. LAWRENCE T. PRICE, *Richmond:* Dr. Daniel has just given you a very comprehensive history of prostatic work from the very beginning and on up to the present. This is a subject that has always been interesting to all physicians and to a great number of lay people because of the large number of men past the age of sixty who have to submit themselves to some sort of remedy for enlargement of the gland.

Dr. Daniel covered in his paper practically all of the history and the accepted plan of handling these cases. but I want to emphasize the preparatory treatment, which we at Johnston-Willis Hospital feel is the most important of all the proceedings in connection with the removal of the prostate gland; that is, to give the patient a most thorough general physical examination, to see that the kidney function and elimination are as near normal as possible—this accomplished by either suprapubic drainage or catheter drainage. We prefer catheter drainage in those cases in which the catheter is not too objectionable, and we find if we persist we can get the patient to allow the catheter to remain. In this way the patient can be on his feet and up and about the hospital, and thus in a much better frame of mind than if he is in bed with a suprapubic tube in. When the general condition of the patient justifies the operation, we feel that prostatectomy should not entail any mortality. In the last three or four years we have not lost a case.

The steps that Dr. Daniel outlined in his paper are certainly a great advance over the blind removal with the fingers in the rectum, with no idea of what you are removing but with the idea of getting rid of any tissue that would obstruct the passage of the urine after the patient should recover. By the open operation you can see exactly what you are doing and control all the bleeding by ligation of any blood vessel at the time of the operation. In certain cases the wound can be closed; in others, packing may be necessary.

I really believe, dividing the percentage of the three stages, the pre-operative treatment is about 90 per cent important, operative about 6 per cent, and post-operative perhaps 4 per cent. The pre-operative is certainly the most predominating in importance, though getting the patient up as soon as possible after the operation, within three or four days, and keeping him up is also important; then the removal of the packing, if any has been used, bags, and insertion of the catheter for transurethral drainage, and removal of the catheter after about the eighth day. The patient should be up in a chair all the while and leave the hospital in about three or four weeks.

Dr. Daniel's reference to the transurethral method of removal of the prostate, together with Dr. Dodson's paper yesterday, has covered this very interesting development of the subject most completely. In our hands we have not used this method as extensively as possibly some others, because of feeling that the cases should be very carefully selected and only those cases with median bar or small fibrous prostate, particularly of the posterior lobe, being the offending portion principally. We have not used this instrument in the ordinary large, adenomatous prostate. We feel that not sufficient of the tissue can be removed by this method; though it is claimed that, with the transurethral method, the remaining portion, or a good part of the remaining portion, of the gland gradually subsides and does not cause any difficulty, from the standpoint of obstruction. It is a procedure which is very nice when it works, and, if we perfect this method of work as we have other operations, the probabilities are that in time we can do the majority of the work transurethrally. I am very much impressed with the possibilities and with the results in the cases that I have done. I believe in a few years to come the electrical units that we are using will be perfected and that the precision will be a little more definite.

DR. J. ALLISON HODGES, *Richmond:* I rise to discuss this question from a rather unusual point of view. It is a question of so much importance, certainly to persons who are advancing in age, that it enlists the interest of most of us. I have risen to say this—that I have been theoretically a student of the advances in the last several years of medical and surgical treatment of prostatic disease, because, probably, for personal reasons; and I wish to accord Dr. Daniel the praise of having summarized in a most masterly manner the unusually striking advances along this line.

I have risen, though, especially to say that I have kept in the closest possible touch with the transurethral electrical treatment of this condition and that the results, as I have investigated this method, have been amazing, certainly to me, and I expect to surgeons. Certainly I know nothing practically of such a condition or its treatment, but, following it with the thought that I may some day have to ask some one of my friends to utilize some of these methods, I wish to insist that they study this electrical development of the treatment of this disease. I realize, as Dr. Daniel has said, that it is applicable especially to early phases of the disease. I realize, further, that it has not been tried long enough to know the ultimate results from it; but I must say that the most amazing results that I have ever known from any form of treatment I have had from personal letters from numerous men who have been using this method and have convinced me that it is probably one of the greatest advances in surgical electrical treatment today. The last letter that I have had was from a patient seventy-two years of age who was operated upon on Thursday, left the hospital on Saturday, suffered no hemorrhage, was not shocked, and was in fine condition three months after his treatment. That is a sample of some of the results that I have noticed.

I wish further to say this, at this meeting when we have had really a little stir about rural practitioners and whether or not they have an opportunity to make the same fame and reputation as men happily or unhappily situated in the larger cities—I wish to say that the perfection of this method, in my personal opinion (remember, I am simply a professional tyro in the matter), shows us what can be accomplished by country physicians in a small country town, laboring in the best interests of the advancement of scientific medicine and surgery. The

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man who has done much, if not most, in my opinion, along the line of the perfection and use of this instrument is a simple, plain, country man who, because of his unusual success, has been called to a larger field of activity. Still, unless he had had the preparation, and, far more, unless he and others had had the scientific appeal, unless they had had the energy and the courage to go ahead in the development of this subject, the world and the profession would never have had the advances that they have today. I say that this man's success is simply a climax of the approval that will come to any man, be he situated in the country or in the city, who does something that no one else has done so well before him; and Dr. Davis, I believe, has accomplished much that will be for the benefit of future suffering humanity.

DR. F. S. JOHNS, *Richmond:* This subject of Dr. Daniel's paper has been thoroughly covered at this meeting of the Medical Society of Virginia. There is one point in his presentation which I think should be strongly emphasized. That is in reference to the unfortunate case who does not survive the prescribed treatment. If the case is suitable for surgery, it then becomes the question for our judgment to determine what type of surgery should be used. If it is a clear-cut surgical enucleation, and the hemorrhage is controlled, the results will be excellent. But, when making our rounds on the morning following the prostatic operation, if we see a certain amount of blood in the drainage, and if we wonder whether such bleeding is "too much," I would say to you, that when any man is old enough to have his prostate removed, any amount of bleeding is too much. I would impress upon you the fact that if hemorrhage is controlled at the time the patient is operated on (and by this I mean absolutely controlled), his chances for recovery are greatly increased.

DR. DANIEL, closing the discussion: I am very grateful to Dr. Price and Dr. Johns for their discussion, and I wish to say to Dr. Hodges that he is entirely too young to begin to consider prostatism seriously.

As indicated in the title of my paper, we (Dr. Price and Dr. Johns and I) do not advocate any single procedure. We have incorporated these advances, and they are extremely satisfactory. We have also found that spinal anesthesia approaches the ideal for any prostatic operation. We use the resectoscope in selected cases, as mentioned above. It is not a minor procedure, however, and I think some of these people get up too early, as reported by some authors. I do not think it will ever entirely supplant the suprapubic or the perineal operations. It should be remembered that the transurethral removal of the prostate is only a partial prostatectomy. I thank you very much.

THE TREATMENT OF MALIGNANT NEUTROPENIA.*

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This is a relatively new and important disease in which the granulocytes are markedly decreased or totally absent from the blood stream.

This paper will be devoted to a theoretical consideration of the treatment of this disease as well as a review of the treatments that have been used and are now used.

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In a previous article,[1] I discussed at some length the different clinical types that have been found to make up this disease. A classification was formulated based on etiology, and on the clinical course. It will be necessary, to make this discussion on treatment intelligible, to repeat that there are two main groups, malignant (fatal) cases, and benign (non-fatal) cases. The clinical types are; acute, subacute, subchronic, recurring and cyclic. As practically all cases appear acute at their inception, or when first seen by the physician, the treatment would be the same for all types, but when the diagnosis of chronic neutropenia is established, other treatments are suggested.

A brief review of the physiology and pathology underlying this disease will serve to make many points clear concerning the type of treatment indicated.

In the normal physiology of the hematopoietic organ there are two main functions to be considered: first, the growth of the cells, and second, their delivery to the circulation. The concensus of opinion is that the factors involved in these processes are a maturation factor to keep the growth and development normal, and a chemotactic factor to call these cells to the blood stream.

The agents known to cause an increase in the percentage of granular leukoyctes in the blood stream are many, such as cold baths, change from recumbent to the upright position, muscular exercise, foreign proteins, certain bacteria, adrenalin, pilocarpine, nucleic acid and its decomposition products, guanine and adenine, and mechanical stimulation to the vaso-motor nerves. Of the many substances that have been shown to call the granulocytes from the marrow, nucleic acid and its decomposition products are most likely to be a part of the normal mechanism. The continuous physiologic degeneration of large numbers of granulocytes in the blood stream gives a discharge of these products (nucleic acid, adenine, guanine, etc.,) into the circulation. A recent contribution on this subject is that of Doan,[2] in a study of the effect of large doses of nucleic acid and its degredation products on the hematopoietic tissue. We know that the above agents will cause the granulocytes to be delivered to the circulating blood, i. e., they represent a chemotactic factor. Our knowledge, however, is meager concerning an agent which will stimulate maturation of these cells. If these cells are not developing, an

agent to stimulate their delivery to the circulating blood is of doubtful value.

The granulocytes in the hematopoietic tissue are constantly active in the process of growth and development. Some idea of this activity may be had when it is considered that in each twenty-four hours approximately one-fifth of the total number of granulocytes in the circulating blood are destroyed and replaced. It will be remembered that the hematopoietic tissue manufactures erythrocytes, thrombocytes and granulocytes. The mechanism which keeps the rate of growth of these cells at a constant pace with the rate of physiologic degeneration was little understood until Minot and Murphy[3] introduced the liver diet for pernicious anemia, and Cohn et. al.,[4] isolated from the liver the specific substance responsible for the improvement in this disease. This involved the discovery of a maturation factor for erythrocytes, which was evidenced by the speedy appearance in the peripheral blood of reticulated erythrocytes of normal size. The liver extract now in use does not supply a maturation factor for granulocytes. However, the liver seems a likely place for the manufacture of this substance, as in an early period of fetal life it functioned as the hematopoietic organ for both erythrocytes and granulocytes. Perhaps a different process of extraction is necessary. There must be a similar maturation factor in the body to regulate the normal production of granulocytes. Therefore, the modern aspect of this problem involves an investigation of the chemical maturation factors which determine the granulocytes. These chemical factors are to be sought in certain organ extracts, as well as in specific dietary factors, some of which may be vitamines. The preliminary report by Morris et. al.,[5] on a specific hematopoietic hormone in normal gastric juice may be of significance, although their work has been on cases of pernicious anemia.

Sternal marrow biopsies and autopsies on cases of benign and malignant neutropenia clearly indicate that there are two types of neutropenia from a pathological standpoint. There are cases showing peripheral neutropenia with aplastic myeloid tissue. These may be considered as due to a lack of the maturation factor for granulocytes. This type bears a marked similarity to pernicious anemia. The other type of case shows a peripheral neutropenia with normal or hyperplastic myeloid tissue and may be considered as due to a lack of the chemotactic factor.

This physiology and pathology of the granulopoietic tissue should be kept in mind in considering a treatment for this disease. The practical application of this knowledge is discouraging for the cases that are to be treated at the present or in the near future, for it involves considerable experimental work.

A review of the literature indicated that most authors feel that a specific and satisfactory treatment has not yet been discovered for this disease, many feeling that recovery, when it does take place, is spontaneous and not influenced by the type of treatment. Many cases are on record in which spontaneous recovery took place in what seemed in the beginning to be a malignant (fatal) case. Such a case is reported by Hamberger,[6] a patient with 1,500 white cells and 2 per cent neutrophiles. There was a gangrenous area over the most prominent part of a left lateral cervical glandular swelling which sloughed. This patient recovered in four weeks without any active treatment and was still well five years later. One case that came under my observation recovered without any active treatment except rest and a diet rich in vitamine B. Also, in many recovered cases, several types of treatment were used in each case so that it was impossible to draw decisive conclusions as to the efficacy of the measures that were used, or to say which, if any, was responsible for the cure.

The treatment for this disease must be considered under two headings. First, the treatment for the acute cases, which means the employment of an agent which will stimulate maturation of the granulocytes and cause their delivery to the circulating blood in the shortest time possible. The mere absence of granulocytes from the blood stream for seven days is probably incompatible with life, and in a system devoid of granulocytes, infection quickly takes place. Second, we must consider the treatment of chronic cases with the object of preventing a recurrence, if possible.

Treatment for Local Lesions.—This disease is characterized by an early breaking down of the normal protective mechanism afforded by the neutrophilic granulocytes. With these granulocytes absent, the organisms ever present in and on the body quickly invade. Therefore, infection, local or general, is the most frequent complication of benign and

malignant neutropenia. The most frequent local lesions are in the mouth and throat. An antiseptic that will not cause a chemical destruction of the tissue is advised. For local treatment to the oropharyngeal lesions, Hamberger[6] advises the following: after nourishment the mouth and throat are sprayed with a saturated solution of potassium chlorate, a compressed air atomizer being used. Following the spraying, each ulcerated area and the gums are swabbed with a solution of copper sulphate, 10 grains to the ounce. This oral treatment is given as often as five times per day, less as improvement takes place.

Phlegmonous masses in any locality should not be incised unless absolutely necessary, since no local abscess forms under the existing granulopenic state. After the neutrophilic granulocytes return to the blood stream in sufficient numbers, abscesses may form, and incision and drainage may be instituted, if necessary. However, when the neutrophilic granulocytes return, many pathological conditions will right themselves. Surgical procedures of any type should not be attempted in these patients, as it is dangerous in the presence of a leukopenia, especially a neutropenia. Such a procedure may bring about a sloughing of tissue, as healing cannot take place normally in the presence of a leukopenia and neutropenia. There are cases on record in which necrotizing changes have appeared in the skin at the site of veni-puncture.

Miscellaneous Agents Used.—In the past it was thought that an agent introduced subcutaneously which would cause a local abscess would in this way stimulate the production of neutrophilic granulocytes. Turpentine was used for this purpose. Intramuscular injections of milk were given for the foreign protein reaction. Such agents are rarely used now, as they have not been shown to have any therapeutic value. Intravenous injections of gentian violet and acriflavine have been given, but they will not stimulate the production of granulocytes. Perhaps they were used with the idea in mind, that there was a blood stream infection. Fetal liver, and extract of bone marrow have been administered, but no definite results attributed to them. Squibb's leukocytic extract, in daily intramuscular injections of 50 cubic centimeters, divided into two doses, has been used in many cases along with transfusions and other forms of therapy. Definite and gratifying results from the above agents were lacking and they are rarely used now.

Preventive Treatment.—There is little definite information available as to the management of chronic cases and the prevention of recurrence of acute attacks. Roberts and Kracke[7] made a statistical study of 8,000 records of leukocyte and differential counts from a series of ambulatory patients seen between the periods of 1920 and 1930. Their study points out many interesting facts. In the granulopenic group of this series, the count ranged from 4,000 down to 1,000. There were 1,881 patients showing a granulopenia, or one out of every four. This number is significant, since benign and malignant neutropenia develops chiefly in the patients with granulopenia. In this group the chief complaint was weakness. The evidence accumulated indicates that weakness, exhaustion, fatigue, and tendency to sleep are the chief results of a depressed granulocyte count. Patients who have had more than one or two attacks know by their feelings when a granulopenia is present. A great many patients give a history of great mental stress or emotional shock. A number of chronic cases improve with rest. Roberts and Kracke, in their series, report two such cases: one, a man, improved during 1931, business being so poor he had rested more than usual; the other, a physician, improved after retirement, but it left him with a loss of thirty pounds in weight that he never regained, and a myocarditis. Just in what manner the granulopenia affects the heart is not clear, but an arrhythmia, tachycardia and tumultus heartbeat are recorded in many cases. This makes it appear essential that patients with granulopenia rest in bed until the granulocytes approach normal. From the foregoing, then, we can say that rest and freedom from mental and emotional stress should be advised. It would also seem advisable that such patients should refrain from using any drugs shown to have a depressing effect on the granulopoietic tissue, such as those containing the benzene ring. It would be advisable, also, to attempt to clear up all foci of infection, being especially solicitous concerning mouth hygiene; in fact, the most scrupulous general hygiene should be observed. A generous allowance of vitamine B should be included in the diet. Operative procedures on these patients should be approached with considerable caution, as the granulopenic state

may develop at any time and prevent proper healing. Routine blood counts should be studied with great care and all patients having a granulopenia should have careful observation and frequent blood counts.

Diet.—Diet may play a more important role both in etiology and treatment than is now imagined. Doan,[8] experimenting with pigeons by underfeeding, reduced the red marrow of the radius to an extreme hypoplasia. There were only three component parts left: blood vessels, fat cells, and a minimal residual framework of reticulum and reticular cells. Lossen[9] made counts of the total number of cells per cubic millimeter in children's marrow, finding that their number seemed, in a general way, to be dependent on the state of nutrition. If this can be proven and the dietary factor that has a specific influence found, it will have a most practical bearing. If, as Minot suggested, a diet rich in vitamine B is of material aid, especially in the chronic, recurring and cyclic cases, the diet should contain a liberal supply of the following, arranged in order of vitamine content:

Excellent—Asparagus; kidney, navy and soy beans; raw cabbage; raw tomatoes. wheat germ.

Good—Heart; liver; kidney; egg yolk; milk; whole cereals; green vegtables; fresh fruit juices.

Fair—Lean muscle meat.

A case of recurring benign neutropenia in a series of cases to be reported at a later date (*Arch. Int. Med.* 51:1933) received the following daily diet during a first and second attack: four egg yolks in milk (chocolate flavored) 750 cubic centimeters, tomato juice 500 cubic centimeters, orange juice 750 cubic centimeters, grape juice 250 cubic centimeters, puree of pea soup 250 cubic centimeters. As soon as the patient was able to take more solid food, creamed asparagus and cooked oatmeal were added to the list. The patient gained six pounds on this diet during two weeks in bed. This diet, and local treatment to the mouth and throat were the only therapeutic measures used in this case.

Treatment of Benign and Malignant Neutopenia Due to Arsphenamine.—Foster[10] successfully treated "malignant" neutropenia due to arsphenamine by the intravenous use of sodium thiosulphate. Kennedy,[11] and O'Leary and Conner[12] also report similar success. The best results are to be had from the intravenous administration of sodium thiosulphate, although it can be given by mouth. McBride and Dennie[13] advise that it be given in not more than 20 cubic centimeters of distilled water, with daily intravenous injections for four days, and then alternate days, for as many injections as may be necessary, in doses starting with 0.3 grams, and increasing the dose by 0.15 grams daily. It is non-toxic in doses up to 2.0 grams. Dodd and Wilkinson[14] say there is no specific or stimulating action attributed to transfusion in these cases. Moore and Keidel[15] call attention to the appearance of prodromal or warning symptoms in these patients. These are manifested by itching, mild rash, prolonged fever, malaise, or any tendency toward purpura. They examined the blood in several cases showing such symptoms and discovered a slight decrease in the neutrophilic cells, an eosinophilia varying from 5 to 8 per cent, a slight increase in the endothelial leukocytes and the presence of numerous fragile leukocytes.

Splenectomy.—Splenectomy was performed in one case reported by Baldridge and Needles.[16] The patient died thirty-five days after the operation. There was not the usual rise of leukocytes after the operation as in other cases, but there was the usual platelet response. The bone marrow at necropsy showed an overgrowth of myelocytes and myeloblasts almost as marked as in myelogenous leukemia. The authors comment that it was unfortunate that a biopsy of the bone marrow was not obtained before splenectomy, because it could have been determined the part played by the splenectomy in this overgrowth of myeloid cells.

Transfusions. — Transfusions have been used in many of the cases reported, some recovering, some ending fatally. Transfusion is essentially empiric. No definite conclusions as to its efficacy can be drawn from our experience or from the literature. In practically all of the cases, other measures were used along with the transfusions. It is an established fact that repeated transfusions lower the rate of erythropoiesis[32] and perhaps granulopoiesis. We do not have any evidence that transfusions actually stimulate granulopoiesis or that the neutrophiles added in 500 cubic centimeters of blood would be of any assistance, as the life of the neutrophile is very short (five days), and the number added would be quite small compared to the number needed. In Case 2 of a series of cases reported by Conner et. al.,[17]

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they point out that three hours after transfusion, their patient had 300 less white cells. Taking into consideration the limit of error in counting and the rhythmic delivery of granulocytes to the blood stream, it is at least evident that there was not an increase. In Case 13 of a series of cases reported by Jackson et. al.,[18] transfusion was followed by a reduction in white blood cells. Case 16 of the same series was given a transfusion after nucleotides had caused an increase of white cells to start, and there followed a reduction in white cells. Such a reduction of white cells was not seen in the other cases treated by nucleotides alone, after a rise had started. Apparently the rate of granulopoiesis was lowered in this patient by the transfusion. The blood from a healthy donor may contain the principles to bring about normal maturation, but the amount of this substance added to the recipient also would be too small compared to the amount needed.

Immuno-Transfusion. — In June, 1930, Fisher[19] reported the treatment of a case of "malignant" neutropenia successfully by immuno-transfusion. The patient was a nurse, aged 24, who had suffered with sore gums and malaise for two weeks. Finding Vincent's organisms on the gums, she was given .4 grams neosalvarsan intravenously. The next day she was much worse, developed sore throat, and was admitted to the hospital. The white cells totaled 1,200, with 6 per cent granulocytes. The second and third days she was treated with an ordinary transfusion of 500 cubic centimeters of unmodified blood, twenty-five million dead typhoid germs and an ampoule of sodium nucleate. There was no improvement in symptoms or blood picture. On the fourth day of her illness, a donor of the same group, who had recovered from this disease in 1927, was secured, and 500 cubic centimeters of his blood was given to the patient. The third day after this transfusion, or seven days after the diagnosis had been made, the total count was 7,800 and there were 21 per cent granulocytes. (In a spontaneous recovery, improvement occurs at about this time also.) In November, 1930, Harkins[20] also treated a case of "malignant" neutropenia successfully by transfusing into the patient 500 cubic centimeters of blood from a patient who had recovered from the disease.

No definite conclusions can be drawn from two cases. There is not any evidence so far to indicate that any kind of immune bodies are formed in the blood stream in this disease. If a recovered patient's serum contained immune bodies, relapses and recurrences should not be the rule. One attack does not give immunity from further attacks. It does not seem advisable to put a strain on the blood-forming tissues of any patient who has had an attack of such a fatal disease. We would not use a patient who had pernicious anemia as a donor for a recipient who had the same disease.

Transfusions and Neosalvarsan. — The practice of adding neosalvarson to the transfused blood now does not seem wise, as Farley[21] reviewed from the literature thirty-nine cases in which the function of the bone marrow was depressed following the use of various preparations of arsphenamine. The symptoms varied from those of purpura hemorrhagica to those of severe aplastic anemia and malignant neutropenia, depending on whether the principal effect was on the granulopoietic, megakaryopoietic, or erythropoeitic tissue, or on all of these combined.

Radiation of Bones.—This treatment was first suggested by Friedmann.[22] He applied, in measured amounts, 1/20 of an erythema dose of roentgen rays to the bones of the skeleton, using a hard filter (6 millimeters copper). He radiated the long bones in four cases, giving one to three treatments at intervals of from two to several days. He reports that improvement from roentgen ray treatment may begin within twenty-four to thirty-six hours, both in symptoms and blood picture. He says, regarding the dosage, that no definite judgment can be rendered. One irradiation with 1/20 skin unit dose may produce a blood crisis in one patient and in another it may take three doses to produce a change in the blood picture. In 1930, Friedmann and Elkeles[23] published another article on roentgen treatment of this disease. The first case treated by roentgen ray in this country was by Call et. al.,[24] and the technic given by Friedmann was used. Waters and Firor[25] report five cases treated with roentgen ray; four are still living; one was in extremis when first seen. Their technic was as follows: the lower extremities, the pelvis, upper humeri, and shoulder girdles were irradiated in the course of three or four treatments. Voltage values of 200,000 with aluminum and copper filtration, both separately and combined, with effective wavelengths ranging from 0.197 to 0.161 angstrom

units, were used. The measurment of dosage was effected by the employment of a dosimeter, reading in roentgen (R) units, adopting 600 units as the erythema dose, which was that agreed upon at the International Conference of Radiologists at Stockholm in 1928. When such a small dose is to be used, an accurate determination is imperative. Fussinger et. al.,[26] report, that roentgen therapy may, under certain circumstances, provoke an "agranulocytic syndrome" and report one case. Potter[27] reports a case which in the first stage gave the clinical and laboratory picture of malignant neutropenia, and states that it terminated with the picture of myelogenous leukemia, although, judging from the laboratory reports, it was a lymphatic leukemia. We do know that lymphocytes are more easily stimulated by roentgen ray than are the granulocytes. This patient was given seven irradiations of one-half erythema dose each, which is a much greater dose than that prescribed by Friedmann. Neidhardt[28] reports the treatment of a severe case with roentgen ray. He used 1/20 of the erythema dose. Two hours after the treatment, the cells rose from 500 to 800; eight hours later, 1,700; the second day, 3,800. A second treatment was given, and eight hours later the total cells were 9,200. The granular cells steadily increased and the clinical condition improved. Aubertin and Levy[29] say, concerning roentgen ray treatment: "The efficacy of radio-therapy does not appear doubtful, but it would be well to wait for further observations to appreciate its true value and to fix the rules of its application."

Rationale of Roentgen Ray Treatment.—In the adult, the marrow in the shafts of the long bones is mostly adipose tissue, having little or no blood-forming function. When excessive or pathological demand exits, there is a formation of new centers by differentiation of the myelobasts into granular myelocytes, the adipose tissue of the bone marrow being replaced by this newly-formed tissue. One theory is, that irradiation may aid in the formation of this new tissue. The only way of proving just what effect, if any, the roentgen ray has directly on the yellow marrow would be through biopsy as soon as the young granulocytes were appearing in the blood stream. Some say we cannot be sure whether this apparent stimulation is the result of chemical changes in the blood, or due to the roentgen ray itself, or whether the recovery is spontaneous. Certainly there is no evidence that a cell *per se* is affected by the roentgen ray other than in a destructive manner. Friedmann[22] says: "It is evidently essential that as large a surface of the body as possible be subjected to irradiation. Whether, thereby, a direct effect is exerted upon the bone marrow, or an indirect effect by the irradiation of other tissues is also an open question." Also, the effect of roentgen ray may be indirect, stimulating organs of internal secretion to produce maturation products for granulocytes. Doan's[2] theory is that roentgen ray benefits the type of case showing peripheral neutropenia with normal or hyperplastic myeloid tissue. The roentgen ray in these cases brings about a primary destruction of some of the intact myeloid foci with a liberation of autogenous nucleotide, which then initiates the maturation and delivery of granulocytes from the remaining myeloid foci. It appears, from a review of the literature, and following the results in the case treated by Call et al.,[24] that the roentgen ray might have an important role in the stimulation of the granulopoietic tissue, but definite proof is lacking.

Nucleotide Therapy.—The nucleic acids of the animal body occur mainly in combination with protein material in the so-called nucleoproteins of which they form the characteristic radicals. The amount and character of the protein with which the nucleic acid molecule is combined varies, and the acid may, in certain cases, be found in cells in a free form. Those tissues are richest in nucleic acid which contain the largest amount of nuclear material and of nucleo-protein, as glandular tissues, thymus, spleen, liver and hematopoietic tissue. The nucleic acids are a distinct class of substances, characterized by their decomposition products. Nucleic acids on hydrolysis yield the purine and pyrimidine nucleotides. The purine nucleotides on further hydrolysis finally yield the purine bases, adenine and guanine.

The first work done on the nature of leukocytosis produced by nucleinic acid was by Ames and Huntley.[33] Jackson[34] was the first to demonstrate that pentose nucleotide existed in normal human blood. This substance is known to exist principally in the nuclei of living cells. Doan et. al.,[2] in their experimental work with large doses of nucleic acid, showed clearly its chemotactic effect. They also found that with nucleic acid there was a leukopenia preceding the leukocytosis, due

to a temporary storage of the granulocytes in the spleen. Then they found that the granulocytes could be called from the marrow by the split products of nucleic acid, adenine and guanine, and that after giving these substances, the leukocytes were not withdrawn from the circulation by the spleen, so that there was a direct leukocytosis without the temporary leukopenia. Reznikoff[35] reports four cases of malignant neutropenia, three of which recovered following treatment with nucleotides. The investigator actually used purine bases, a decomposition product of nucleotides, as he himself pointed out in a later issue of the same journal.[36] These substances given intraveously to rabbits caused a marked increase in the number of neutrophilic granulocytes without any effect on the temperature or any other cells. Adenine sulphate or guanine hydrochloride obtained from the Eastman Kodak Company was used. Other therapeutic agents were used along with this, so no precise conclusions can be drawn. Jackson et. al.,[18] in their series of cases, used the unbroken pentose nucleotide, called nucleotide K-96, which is prepared by Smith, Kline and French Company, according to the technic of Jones and Perkins[37] and under the direction of the Harvard Medical School. Twenty cases were treated. Thirteen were "malignant" neutropenia, five leukopenia and neutropenia due to an infection, and two benzol poisoning. Of the thirteen cases of "malignant" neutropenia treated, seven recovered. The first sign of improvement occurred between the third and seventh day, and was usually on the fifth day. The total and differential counts were invariably normal in ten days, sometimes eight. They comment: "The consistency with which the reaction occurred on or about the fifth day is of great significance. It is at this time that the reticulocyte rise begins to take place following liver therapy in pernicious anemia." This reaction would only tend to show that the time for the maturation of the granulocytes was about the same as that of the erythrocytes. We do not have any definite experimental proof, however, that the nucleotide K-96 supplies a maturation factor for granulocytes. The experimental work on nucleic acid and its decomposition products has shown only a chemotactic factor. Five of the cases of malignant neutropenia in this series, with no essential clinical differences from those of the recovered cases, died in spite of active nucleotide therapy. This result recalls the possible difference between the pathology of benign neutropenia and malignant neutropenia, i. e., the function of granulopoiesis was depressed, maturation had ceased, and the bone marrow was aplastic in the fatal cases, while in the benign cases of neutropenia the function of granulopoiesis was arrested, maturation had not ceased, and the bone marrow was not exhausted but was normal or hyperplastic, the chief fault seeming to have been in the delivery or lack of a chemotatic factor. It seems only reasonable to assume that if the cells are not developing they cannot be called to the circulation. The acute cases in Jackson's series were given 0.7 grams of nucleotide K-96 in 100 cubic centimeters of saline solution intravenously, daily for four days, and 0.7 grams in 10 cubic centimeters of distilled water, given in addition, intramuscularly, on the same days and on each day subsequently until there was definite improvement. The intramuscular injections usually give no reactions; the intravenous gives a sharp, temporary reaction sometimes. Jackson et. al., conclude: "We believe that these nucleotides may have a definitely favorable effect on the average inactive bone marrow and in certain cases of malignant neutropenia, and we believe that the substance is worth further trial in such cases."

Calcium Gluconate.—Hare and Childrey[38] report a case of malignant neutropenia in a patient whose symptoms suggested a disturbance of the calcium metabolism. Calcium gluconate was administered and granulocytes appeared in the blood on the fifth day following treatment. This suggested to the authors that this agent may be of therapeutic value.

Summary

This paper is devoted to a theoretical consideration of the treatment for this disease, as well as a review of all forms of treatment to be found in the literature. The rationale of these treatments, where possible, has been discussed.

A specific and satisfactory treatment for cases having aplastic myeloid tissue has not yet been discovered; recovery if it occurs is probably spontaneous.

The physiology and pathology of the hematopoietic tissue has been briefly reviewed, and based on this, the theory advanced that a specific treatment for certain types of this disease involves an investigation of the chemical ma-

turation factors which determine the granulocytes.

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DISCUSSION

DR. WILLIAM B. PORTER, *Richmond:* I have had the pleasure of reading the Doctor's previous paper, appearing in the Stuart Circle Hospital Bulletin. It conta ned much useful data and it has a very clear classification of this very interesting and mysterious malady. The Doctor has covered in a comprehensive fashion what is known about the disease. I think the more one sees of malignant neutropenia the more he is impressed with the viewpoint expressed in the last paragraph of the paper, namely, that a specific treatment will be had from an investigation of the chemical factors concerned in the maturation of the leucocytes.

In the earlier literature dealing with pernicious anemia, the prevalent impression was that pernicious anemia was a disease fundamentally concerned with aplasia of the bone marrow. It is only in recent years that hyperplasia has been shown to exist in the bone marrow in Addisonian anemia. This has resulted in a search for a substance which would unite with the hyperplastic bone marrow and release immature red cells. It is suggested that a deficiency may exist in malignant neutropenia involving the leucoblastic tissue in the bone marrow.

As for the therapy of the disease I think we are still stumbling along as we did for many, many years in the therapy of pernicious anemia. I am perfectly certain, however, that the work in pernicious anemia will hasten the discovery of a remedy for this malady.

I want to thank Dr. Beck for the discussion, for it is a contribution to the sum total of our knowledge of this disease.

DR. WALTER B. MARTIN, *Norfolk:* I want to make just one remark in reference to the possible value of the intramuscular liver extract in the treatment of these cases. I have had occasion to treat three cases with the regular pernicious anemia liver extract intramuscularly, with recovery. One of these was of particular interest, being first seen about three years ago, with a rapidly progressing attack. At that time the patient was given the liver extract by mouth, and she recovered. Not much importance was attached to that, because some of these cases spontaneously recover. Two years later she had an attack, and we were able to detect it very early, when the drop in the white blood count first began. Very promptly on the intramuscular administration of liver extract there was a return of the blood picture to normal, with subsidence of the throat symptoms and of symptoms in the mouth.

I know that three cases are not enough to base any conclus'ons on, but I think it is well to bear in mind as a form of therapy worth trying out.

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UNDULANT FEVER AND ITS RELATION TO BRUCELLA INFECTION (CONTAGIOUS ABORTION) IN CATTLE AND SWINE IN VIRGINIA.

A Preliminary Report.*

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In recent years there has been a growing appreciation of the interdependence of the diseases of man with those of animals. Undulant fever is a classical example of this relationship, along with tularemia and the typhus group. Each year since 1925 has seen an increasing number of cases of undulant fever recognized and reported, and it is apparent that the disease is widely distributed in the United States, no large area of the country being entirely free from it.

The importance which it assumes as a medical problem in any locality will vary with local conditions. Epidemiological studies have shown that cases can be divided into three groups according to their probable mode of infection. In the first groups are included those cases which give no history of contact with livestock but have consumed raw dairy products from infected herds. This is largely an urban group. In the second group are included those cases which apparently originate from direct contact with infected livestock, whether it be cows or swine. This group is chiefly rural and is composed largely of farmers and veterinarians—(livestock group). In the third group are placed those cases which apparently originate from the handling of meat products after the slaughter of infected animals, chiefly swine. This is composed almost exclusively of abattoir employees—(abattoir group). To which group the cases belong in any given area must be established by careful investigation.

The epidemiological studies which have been made in this country have dealt largely with conditions as they are found in the middle western and northern United States. This study was undertaken to ascertain just what the problem is in Virginia, particularly in the vicinity of Charlottesville, to what extent cattle suffer from contagious abortion, how prevalent the infection is among hogs, with what frequency human cases of undulant fever occur and what the common source of human infection is in this State.*

Historical Review

Ever since the brilliant studies of the British Commission to Malta, 1904-07, it has been well-known that a disease of man, variously called "Malta fever," "Mediterranean fever," or "undulant fever," caused by the "micrococcus melitensis" of Bruce (now called Brucella melitensis), was contracted by drinking raw milk from infected goats. In the United States, Craig (1905)[1] called attention to its sporadic occurrence and, later, Ferenbaugh and Gentry[2, 3] and Lake[4] found the disease to be endemic along the Mexican border where goat's milk was used to a considerable extent.

In 1918, Alice Evans,[5] a bacteriologist, called attention to the essential similarity or identity of the organism causing contagious abortion in cattle, B. abortus, and "B. melitensis," which caused abortion disease in goats and undulant fever in man. This work was extensively confirmed. A new species—Brucella melitensis—was created to include the group, and strains coming from caprine sources were designated as the melitensis variety, from bovine sources as the "abortus" variety, and from porcine sources as the "suis" variety.

The relationships of these microorganisms led to a serious search for cases of undulant fever in man in this country and elsewhere, originating from infected cattle or swine. For the first convincing report on the occurrence of such infections, credit probably belongs to Bevan[6] who in 1925 observed a series of thirty-five cases of undulant fever in Rhodesia, associated with infectious abortion in cattle, in one of which the cause was attributed to the manual removal of a placenta from a cow which had aborted. At about the same time Keefer (1924)[7] reported a case of undulant fever in Baltimore in which there was no traceable connection with goats.

Cattle raisers in this country and abroad have long been familiar with a disease of cows known as "contagious abortion." In 1897, Bang, working with Stribolt, demonstrated microscopically a small Gram negative bacillus from the uterine exudate of a cow with impending abortion and experimentally proved its etiologic properties. It was called Bacillus abortus (Bang). Because of the eco-

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*Grateful acknowledgement is made to the State Board of Health for full information regarding the cases of undulant fever reported by physicians, and to the State Veterinarian for the free use of his records of tests made on cattle throughout the State.

nomic importance of the disease, it was extensively studied especially by the United States Bureau of Animal Industry. As early as 1911, Shroeder and Cotton[8] ascertained that infected animals excrete the organism in their milk, and demonstrated its presence in a large percentage of specimens of milk bought on the open market. From 20 to 35 per cent of dairy cows giving a postive agglutination test were found to be eliminating the organism in their milk. Of cows that had actually aborted 40 to 50 per cent were found to harbor B. abortus in their milk.

In 1914, Traum, working in California, recovered Bang's bacillus from swine. The infection in these animals is similar to that in cattle. It produces abortion, but has a greater tendency to become latent and undergo spontaneous cure in swine. The disease, however, does not appear to be so widespread among hogs in this country nor so important from an economic point of view as it is in cattle.

Carpenter[9, 10] brought convincing evidence that the organisms recovered from a series of human cases were identical with the organisms which cause contagious abortion in cattle, and that the source of infection in his cases was undoubtedly the consumption of raw cow's milk, containing B. abortus. As a result of these studies and by analogy with what was known to be the case in Malta fever, it was at first supposed that a very large number of cases of undulant fever must be occurring in the United States, and that the chief mode of transmission was by the consumption of milk from infected cows.

Further studies, however, established the fact that most people had a surprisingly high degree of resistance to infection. For example, the studies of the New York Veterinary College[11] showed that in a certain highly developed diary district, a large percentage of the animals were infected with contagious abortion. Approximately 20 per cent of the raw milk sold in this territory contained B. abortus in sufficient numbers to produce lesions in guinea pigs. In spite of this situation, in a population of 337,000 a considerable proportion of whom drank raw milk and had no direct contact with dairy cattle, only twenty-six cases of undulant fever had been recognized in the course of three or four years. Huddleson and Orr[12] found that among 500 individuals constantly exposed through an infected raw milk supply only 1.4 per cent showed evidence of infection. Evidently the bovine strain of Brucella is much less pathogenic for man than is the caprine strain.

The epidemiological studies quoted above and those of Hardy[13, 14] and Hasseltine[15, 16, 17] have established beyond all doubt, however, that a considerable number of cases of undulant fever in man are occurring each year as a result of the consumption of raw milk from infected herds. In addition to these, there is another group which are infected by direct contact with infected cows or pigs during life —farmers and veterinarians particularly,—or after slaughter—abattoir employees. Strains originating from swine have been found to be more virulent for man than are the bovine strains.

Brucella Infection in Cattle in Virginia

As is well-known, cows are usually infected about the time of sexual maturity, and the presence of the disease becomes manifest by the premature expulsion of the foetus at the first or second pregnancy. Thereafter the animal may abort a second or third time and become sterile, or the disease may go on to spontaneous cure through the development of immunity. In a proportion of animals, however, it localizes in the mammary glands and may be excreted in the milk for months or even years.

The presence of infection is detectable by the demonstration of agglutinins for the Brucella organisms in the blood serum. This test is subject to the same errors of technique and interpretation in this disease as it is in others. When properly performed it affords an accurate indication of an active, latent or recent infection. The technique used in this study was that recommended by the United States Livestock Sanitary Association.[18] Complete agglutination in a dilution of 1:25 is regarded as suspicious, of 1:50 as very suspicious, and of 1:100 as a positive indication of infection.

In Table I is presented the results of testing three groups of cattle. The first group is the experience of the State Veterinarian's office in testing cattle in various parts of the State upon application by the owner. In a general way it represents a random sample of the cattle in the State, although the fact that many herds were tested because the owner was suspicious of the presence of contagious abortion may have tended to increase the percentage of positives. Nine and eight-tenths per cent were

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TABLE I.—*The results of agglutinin tests for Brucella abortus with sera from dairy cattle, Virginia, 1931.*

Sera from Dairy Cattle	1. In State at Large		2. In Albemarle County		3. Supplying Undulant Fever Cases	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Positive	2,104	9.8	76	13.0	109	40.0
Suspicious	603	2.8	32	5.5	8	2.9
Negative	18,747	87.4	477	81.5	156	57.1
Total	21,454	100.0	585	100.0	273	100.0

found to react in titres of 1:100 or more. Many herds were, of course, found to be free from infection either because of chance or because the owner had taken steps to eliminate his reactors and keep a clean herd. A majority of herds, however, were found to be infected. Taking the figures as they stand, it may be said that as a maximum about 10 per cent of the dairy cattle in the State are suffering from this infection at any one time, and, based upon experimental evidence, about one-fourth of these, or about 2 per cent of the cattle in the State. are excreting Brucella organisms in their milk.

In an effort to ascertain more exactly what was happening in a limited locality, seventeen out of some thirty-six herds which were supplying milk to Charlottesville in Albemarle County were tested. Of these seventeen herds seven were found to have no reactors and were certified as free from contagious abortion to the State Veterinarian. Including the negative herds, there were 585 cattle tested. Seventy-six, or 13 per cent, were found to be positive reactors by repeated tests. The figure is not essentially different from that obtained in the State at large. Again, one can infer that 2 or 3 per cent of the cows supplying the milk to this municipality are excreting Brucella organisms. About one-half of the milk supply of this area is consumed in the raw state.

The third group in Table I consists of ten herds and 273 cattle tested because of association with the occurrence of a human case of undulant fever. One hundred and nine, or 40 per cent of the animals tested, were found to be positive reactors. The difference between this result and that found in the unselected herds is sufficiently large to strongly suggest a significant relationship between the occurrence of a high percentage of reacting dairy cattle and the occurrence of human cases.

Brucella Infection of Swine in Virginia

In the experience of the State Veterinarian and of the Department of Zoology and Animal Pathology at Virginia Polytechnic Institute there have been no complaints of losses due to infection of swine with Brucella. Observations on swine herds distributed throughout the State were not available. It was thought that some indication of the situation might be obtained by testing samples of blood from hogs at the time of slaughter.

Since a good many hogs slaughtered in this State are shipped in from the middle west, care was exercised to obtain specimens only from lots raised and purchased locally. In order to obtain samples from different parts of the State, arrangements were made to secure blood specimens from abattoirs located at Richmond, Lynchburg, Charlottesville and Harrisonburg.*

As shown in Table II, 812 specimens of blood were examined. Only twenty-nine, or 3.6 per cent showed agglutination with Brucella organisms in a sufficiently high titre to be classed as positive. Most of these were in one lot slaughtered at Richmond. We were unable to ascertain the exact locality from which they came.

An occasional hog in the Charlottesville and Harrisonburg areas was found to react. This is no more than would be expected from the casual infection of a hog from imported sources, or possibly from association with infected cattle in the same barn or pasture. The experience is too limited to warrant any conclusion, but so far as it goes it fails to indicate the prevalence of infectious abortion among the swine in this State to an extent at all comparable with that prevailing in the dairy cattle.

*The authors wish to express their indebtedness to Dr. R. L. Getz, of Harrisonburg, and Dr. Goodwin, of Lynchburg, for assistance in obtaining this material for examination.

TABLE II.—*Results of agglutinin test with sera from swine slaughtered in abattoirs, Virginia, 1931*

Swine Sera	Total		1. Charlottesville		2. Richmond		3. Harrisonburg		4. Lynchburg	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
Positive	29	3.6	3	1.9	25	5.1	1	0.8	0	.0
Suspicious	209	25.8	36	22.6	137	27.8	30	24.8	6	15.0
Negative	574	70.6	120	75.5	330	67.1	90	74.4	34	85.0
Total	812	100.0	159	100.0	492	100.0	121	100.0	40	100.0

Brucella Agglutinins in Human Sera in Virginia

Both because of the practical bearing which it has upon the interpretation of the agglutination test in the diagnosis of undulant fever and for the indication which it affords of exposure to this organism, a large series of human sera were examined by a uniform technique. The antigen used was a phenol killed suspension of a bovine and porcine strain which had been found by long experience to be a good agglutinator. It was standardized as to turbidity of tube No. 1 McFarland nephelometer. The sera were allowed to stand in contact with the antigen for forty-eight hours in the incubator at 37° C. The results are presented in Table III.

The first group is a series of 1,069 specimens of sera submitted for the Wassermann reaction. These were obtained in part from the Department of Dermatology and Syphilology at the University Clinic and in part from a random sample of the colored population in Albemarle County in the course of a Wassermann survey. They may be said, therefore, to be fairly representative of clinic experience in this section of the State.

It will be noted that in the Wassermann group only three out of the 1,069 sera showed agglutination for Brucella in dilutions of 1:100 or greater. There was no history obtainable of undulant fever in these three individuals. In general the results correspond with what has been observed elsewhere, i. e., relatively few normal individuals in the general population agglutinate Brucella in a titre of 1:25 or 1:50 and a reaction of this magnitude should be looked upon as significant and repeated. The occurrence of a positive agglutination in a titre of 1:100 is still more rare in healthy individuals and should be regarded as highly suggestive but not necessarily conclusive of the diagnosis of undulant fever. It may be explained by recent contact with infected animals or their products unaccompanied by clinical manifestations.

The necessity for caution is brought out by the results of examination of sera from abattoir employees and veterinarians as shown in Table III. These are groups specially exposed to Brucella infection through direct contact with animals in the pursuit of their occupation. It will be noted that the percentage of reactions found in high dilutions is very

TABLE III.—*The results of agglutinin tests for Brucella abortus with human sera, Virginia, 1931*

Human Sera	Wassermann Group		Abattoir Group		Veterinary Group	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Positive: 1:25	11	1.0	3	2.2	8	20.0
1:50	19	1.8	2	1.5	8	20.0
1:100	2	0.2	2	1.5	6	15.0
1:200	1	0.1	2	1.5	0	0.0
1:400	0	0.0	1	0.7	3	7.5
Positive (1:100+)	3	0.3	5	3.7	9	22.5
Suspicious (1:25-1:50)	30	2.8	5	3.7	16	40.0
Negative	1,036	96.9	125	92.6	15	62.5
Total	1,069	100.0	135	100.0	40	100.0

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markedly increased in these specially exposed groups.

In the abattoir group, five, or 3.7 per cent, showed a positive reaction in titres of 1:100 or more. One of the five, a colored man who worked on the killing floor, was sick at the time the blood was obtained. His illness had been diagnosed as "lumbago" on account of pains through his back and about the sacro-iliac region. He was able to return to work in about two weeks. Two tests made later on this individual showed a lower titre—1:50. It seems not unlikely that his illness was a mild infection with Brucella although the evidence is by no means conclusive. The one individual giving a positive test in a dilution of 1:400 was a foreman who was enjoying perfect health at the time and stated that he had never been sick in his life. The other three positives gave no history of recent illness.

The experience with sera from veterinarians was similar, but even more striking. Specimens were obtained from forty, or about one-half of those registered in the State. At the same time a history was taken as to past illnesses simulating undulant fever.

Thirty-one of the veterinarians tested were engaged in practice, three in teaching and laboratory work, three in meat inspection, and three in State and Federal work. Sixty-two and one-half per cent showed agglutinins for Brucella in a dilution of 1:25 or more, and of these 22.5 per cent reacted in a dilution of 1:100 or more. In only one instance was there a clear history of recent recovery from a severe clinical attack of undulant fever resulting from exposure while engaged in post-graduate work on abortion in cattle and swine. In one other instance there was a history suggestive of a clinical attack of undulant fever three years previously, diagnosed as "arthritis." This serum showed a titre of 1:400. None of the remaining twenty-three who showed agglutinins gave a history indicative of a clinically recognizable infection with Brucella organisms.

Nine, however, did give a history of that very interesting skin eruption known as erythema Brucellum. It was characterized in four by an erythema more or less urticarial in appearance with itching and burning sensations, coming on within a brief time, a few minutes to a few hours, after the delivery of a calf, and localized to the skin of that part of the arm which had been introduced into the cow's birth canal. In five the history was similar, but the eruption papulo-vesicular, or even pustular in character. The eruption is apparently allergic in nature and due to sensitization to the proteins characteristic of Brucella infection in cows.

The comparison of sera from individuals in exposed occupations with those of individuals in the general population and the analysis of clinical histories leads to the inference that human beings may develop agglutinins in high titer in their blood serum from contact with the organism without the occurence of a clinically recognizable attack. This same conclusion is suggested elsewhere (Carpenter[11]) by studies which showed that the serum of persons drinking raw milk from herds known to be infected with contagious abortion commonly showed agglutinins, while sera from a large group of patients in sanatoriums where the milk supply was carefully pasteurized were negative. These facts must be borne in mind in interpreting the agglutination test in the diagnosis of undulant fever.

Undulant Fever in Man in Virginia

Undulant fever was first recognized as an endemic disease in Virginia in 1927. It was made reportable by the State Board of Health in 1929. Records have accumulated of the occurrence of some eighty-three cases in the past four years. Although the physicians of this State cooperate very fully in the reporting of communicable diseases, it is entirely probable that a few more cases have occurred which have not been brought to the attention of the State Board of Health. It is still more probable that there were a considerable number of mild, unrecognized cases of undulant fever which were undiagnosed or did not seek medical advice. However, at the University Hospital in Charlottesville the admissions to the medical service during the past three years have been very carefully scrutinized for cases of this type. With the total admissions to the Medical Service amounting to about 2,000 per annum, there were six cases of undulant fever recognized in 1930, none in 1931 and, so far this year, there have been four.

So far as these figures represent the situation, and looked at purely from the point of view of morbidity rates, the disease is not statistically impressive as a medical or public health problem. On the other hand, looked at from the point of view of the individual

TABLE IV.—*Cases of undulant fever reported to the State Board of Health, Virginia, up to July 1, 1932*

Year	0–9		10–19		20–39		40–59		60–		Unknown	Total		
	M	F	M	F	M	F	M	F	M	F		Male	Female	Both Sexes
1929	0	0	1	0	0	2	0	2	0	0	0	1	4	5
1929	0	0	1	0	2	0	0	1	0	0	0	3	1	4
1930	0	1	3	0	6	2	4	3	2	2	2	15	8	25
1931	0	0	1	0	8	3	7	1	1	1	1	17	5	23
1932	0	0	2	2	6	1	5	2	2	2	4	15	7	26
Total	0	1	8	2	22	8	16	9	5	5	7	51	25	83

who suffered from an attack and is incapacitated for work or earning his livelihood for from six months to a year or more, it has a great deal of importance.

In Table IV is presented the age and sex distribution of the cases reported as undulant fever to the State Board of Health by years since 1929. The experience conforms to that generally reported elsewhere. Very few cases are found among children in spite of the fact that they are large consumers of milk. This has usually been explained as due to a relatively greater natural resistance on the part of young children, analogous to the relative immunity of calves and young pigs. The explanation is not, however, altogether satisfying. The distinctly higher incidence among males as compared with females is clearly due to the greater exposure on account of occupation—veterinarians, dairymen, farmers, abattoir employees, etc. Among cases due to the consumption of raw milk, the two sexes are equally represented.

During the past two years, as many as possible of the cases reported to the State Board of Health as undulant fever have been investigated through cooperation with the local physician. Where the clinical course of the case and the laboratory findings seemed to establish with a fair degree of certainty of the diagnosis, attempt was made to ascertain the source of infection. The results of investigation of forty-five such cases are presented in Table No. V.

Eighteen, or 40 per cent, gave a definite history of direct contact with dairy cattle, and in some instances there were a few hogs on the same farm so that such animals could not be entirely excluded from consideration. In twelve it was possible to obtain reliable information regarding contagious abortion in the dairy herd. Seven of the herds gave a clear history of this disease and in all five which were tested positive reactors were found. In other words, up to the present all of the herds investigated in connection with contact cases have given evidence of the existence of contagious abortion. In all instances except one, the patient also drank raw milk from the same source, so that it is impossible to be sure

TABLE V.—*Results of epidemiological investigation into source of infection in forty-five cases of undulant fever occurring in Virginia, 1929-1932*

Contagious Abortion Status of Herd Associated with Case	History of Contact with Cattle or Swine		No History of Contact with Cattle or Swine		Total
	Use Raw Milk	Use No Raw Milk	Use Raw Milk	Use No Raw Milk	
Positive by serological test	4	1	8	0	13
Positive by clinical history only	7	0	1	0	8
Negative by test and history	0	0	1	0	1
Unknown	6	0	16	1	23
Total	17	1	26	1	45

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Map Showing Distribution of Positive Reacting Cattle and Undulant Fever Cases.
Explanation of Map
0 to 5 per cent infection
5 to 10 per cent infection
10 to 15 per cent infection
15 per cent and over infection
Case of undulant fever

whether the organism gained entrance to the body through direct contact or through the alimentary tract.

In the remaining twenty-six cases which were investigated there was no history of contact with cattle, swine or goats. In every instance the patient was a customary consumer of raw milk. In nine instances, it was possible to test the herds which were named by the patient as their usual (though not always only) source of milk. The serological results indicated that eight out of the nine herds were undoubtedly infected with contagious abortion. One such herd which could not be tested gave a clear history of contagious abortion, and in one instance the clinical history and the serological test of an implicated herd was negative. It is to be noted that up to the present not a single case of undoubted undulant fever has been found in an individual who customarily consumed pasteurized milk.

In an effort to roughly correlate the occurrence of human cases of undulant fever with the incidence of positive reactors among dairy cattle a spot map of Virginia was prepared. The infection appears to be most widely distributed among dairy cattle in the Richmond area, in northern Virginia and in the Shenandoah Valley. The occurrence of human cases is to a striking degree correlated with this distribution. The highest incidence of the disease in humans appears to be in Albemarle, Augusta and Rockingham counties, in all of which the incidence of positive reactors among dairy herds is above 10 per cent. Reasoning by analogy, more cases of undulant fever would have been expected in the Richmond area. The probable explanation lies in the fact that almost 100 per cent of the milk consumed in Richmond is pasteurized, whereas in the counties named above, considerably less than 50 per cent of the milk is pasteurized.

Two illustrative cases are given below:

A white man, aged 33, was employed as a truck driver at a large boys' school. He had no duties around the dairy barn and gave no history of contact with cows, pigs or goats. The entire milk supply for this boys' school was pasteurized, and the investigator was at a loss to account for the origin of this infection. Upon close questioning, however, it was found that the laborer in question did not like pasteurized milk. Accordingly, he was accustomed to go to the dairy barn and secure his supply of milk before it was pasteurized. Thus, he drank about two quarts of raw milk per day and used cream on his cereals. The herd of seventy animals was tested. Five positive reactors and one suspect were found. The mature swine on the farm were tested and all were negative. The man had a typical clinical course of undulant fever, his serum at one time agglutinated Brucella up to a dilution of 1:3200. Brucella melitensis var. abortus was isolated from his blood.

A high school boy, aged 17, became ill with a continued fever. His physician suspected undulant fever from the clinical course. His serum was found to agglutinate Brucella in a dilution of 1:1600. This boy's father was employed as a herdsman on a large dairy farm. The dairy herd consisting of sixty-seven head had been tested for contagious abortion and twenty-one found positive and three suspicious. The herd had been split and the positive reactors segregated. This boy was accustomed upon his return from school each day to go to the barn in which the infected herd were being milked and drink his fill of the raw product. He had been doing this for about one month before the onset of his illness.

Summary

In brief, this investigation has established up to the present that contagious abortion is widely distributed in the dairy cattle of Virginia, as a general average about 10 per cent being affected. Its intensity and prevalence, of course, varies in different parts of the State, the dairy farming sections, as would be expected, showing the highest incidence. Although swine are occasionally infected, the disease does not appear to be the serious problem in these animals that it is in cattle.

Cases of undulant fever in man are occurring occasionally in the State, particularly in those areas which show a high infection rate among cattle and a high per capita consumption of raw milk. About 40 per cent of the human cases appear to be attributable to infection by direct contact, and about 60 per cent to the consumption of raw milk from infected dairy cattle. As yet no case has been discovered which can be attributed to contact with infected swine or goats.

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Discussion

Dr. Henry B. Mulholland, *University:* First, I should like to say that I think studies of this type, carried out as this one has been, are of the utmost importance. We are studying the disease at its source, and if we succeed in testing all of our cattle in Virginia we shall find out where the clinical cases are coming from.

This disease is almost certainly far more widespread than the present epidemiological statistics show. That has been the experience in most reported studies. The cases have been missed. For instance, in Denmark, a country where the dairy industry plays a very large part, up to 1927 no undulant fever was recognized. Then they started doing routine agglutinations on blood sent in for Wassermann tests, at Copenhagen, and found about five hundred positive agglutinations a year.

Some of the cases which Dr. Maxcy reported were seen in the University Hospital. They presented very interesting symptoms. It is useless to go into all the varied symptoms which a patient with clinical undulant fever may present, because they are manifold. There are several, however, that were present in practically every case. Headache is a very important one. An undulant type of fever, or irregular type of fever, was found in nearly every case. We were rather struck, also, with the prevalence of vague abdominal symptoms. The first case, which was not recognized by us, but which we saw over a period of two years before the diagnosis was made, had these vague abdominal symptoms, which indicated to us a mild degree of gall-bladder disease; but we were never able to prove that, and finally a veterinarian made the diagnosis for us.

Another very interesting case was a boy who came to us with a history of bilateral hydrarthrosis of the knee joints, with no history of fever except for a few days when an epidemic of measles was prevalent in his school. We did a test on this boy and found that the fluid in the joints, as well as his blood serum, was positive. Fluid in the joints is a very common sign in undulant fever. At other times the disease may present the signs of arthritis. The last case that we saw had these vague abdominal symptoms and also a neuritis involving the intercostal nerves. Sciatica is a common symptom, the condition seemingly showing a special predilection for the peripheral nerves.

One point Dr. Maxcy brought out is that there may be positive agglutination tests without clinical manifestations of undulant fever, or without the patient's ever having had clinical undulant fever. I ran across a report in one of the journals describing an epidemic of undulant fever in a Northern school, where two or three boys had clinical signs. The physician in charge of the school ran a test on all the boys, and well over a hundred had positive agglutination tests but did not develop the disease.

In the early days we had some very striking experiences with agglutination tests. Often, when we suspected strongly that the patient had undulant fever, we would send a specimen to two or three laboratories instead of depending only on our own. Now, in our laboratory we use three strains. One strain may give a positive test, while the other two will be negative. So I feel that much remains to be found out about this disease; and it may be necessary to use various strains before we can be sure, with a negative test, that the patient has not undulant fever.

Another fact we were struck by in the early days was that the patient's blood would not agglutinate in the lower dilutions, but when we got up to the higher dilutions it would agglutinate very strongly. Of course, now we are using dilutions up to as high as 1:1240 or 1:1280.

Dr. Wm. B. Poeter, *Richmond:* I should like to ask Dr. Maxcy a question which I hope he will answer. How long does the average case have to be infected before the blood serum becomes positive?

Dr. H. B. Sanford, *Richmond:* I have noticed in these discussions that they all seem to be directed toward cattle, and I should like to ask the public health men and those who have discussed this paper what is the relation this undulant fever bears to abortions and premature labors and miscarriages in women, which are far more important than these things in cattle. I have not heard a word said along that line.

I want to report a case that came under my observation. This was in a colored woman who had had,

as well as I can recall from my history, from seven to nine abortions, miscarriages, and premature labors, altogether. I was impressed by something one of the speakers here tonight said—that after having had this fever for some time a cow would develop a certain amount of immunity against abortion. This colored woman I spoke of gave birth to a normal child last summer. Her first pregnanacy and her tenth were normal.

If anyone here can throw some light on that thing, I should certainly appreciate it.

DR. MAXCY, closing the discussion: The first question, I believe, was in regard to the duration of infection in the cow. The organism has an elective affinity for the foetal membranes and uterus. After expulsion of the foetus, it tends to localize in the supra-mammary lymph glands or in the udder. Here it may persist for months or years. Whether it is being excreted in the milk can only be determined by inoculation of guinea pigs. This is a research procedure and available only where laboratory studies of this disease are being made. While cows may and do recover from the infection, one can never be sure that the cure is complete. The recrudescence of an infection in an animal thought to be recovered may reinfect a herd with considerable loss to the owner.

So far as I know, there is no danger from eating meat from infected animals. I have had no personal experience with the intradermal test. As to how long after the onset until the serum shows a positive agglutination reaction in human infections, I have no original observations to report. Reasoning by analogy with other infectious diseases, one would expect the reaction to appear within three or four weeks. There are cases in which the agglutinin titre of the serum never reaches a high point, but in which a diagnosis is established by recovery of the organism from the blood. Such cases must, however, be extremely rare.

There have been a few reports in the literature indicating that infection with Brucella organisms may cause abortion in human beings. At the University Hospital, we have examined a considerable number of sera from women who aborted during the past year. So far, we have found none who agglutinated this organism in significant dilutions.

EDITOR'S NOTE:—Questions asked by three doctors were omitted as the reporter failed to catch the names so that the transcripts could not be sent for correction. These questions, however, are answered in Dr. Maxcy's discussion.

ULCERATIVE SYPHILITIC LESIONS OF THE STOMACH—THE PATHOLOGICAL ANATOMY OF FOUR CASES.*

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The question of the occurrence of syphilitic lesions of the stomach has passed, in recent years, from a state of skepticism to one of tacit acceptance. This acceptance is implied in numerous case reports embodying clinical and roentgenological aspects, without evident doubt on the part of the authors that they were dealing with syphilis of the stomach. Unfortunately in very few of these cases was opportunity afforded to study the pathological anatomy of the stomach.

This acceptance of gastric syphilis has been retarded by demands seldom made for the diagnosis of syphilitic lesions of any other tissue in the body. Foremost among such demands is that of the demonstration of treponema pallidum in sections of the gastric lesion. The demonstration of these organisms in sections of any tertiary syphilitic lesion always has been uncertain, and rarely successful. Their sparse distribution and resemblance to fibrillar elements of tissue has rendered their identification doubtful. The inadequacy of such a criterion for diagnosis is apparent.

Lesions of the stomach and intestines are not included in Warthin's[1] articles of 1918 and 1929, in which the structures of tertiary and latent syphilitic lesions of various organs and tissues are described. However, O'Leary[2] states that Warthin has found treponema pallida in sections of stomach. McNee[3] seems to have done this too, although Singer and Dyas[4] doubt that the organisms or structures described by McNee were treponema pallida. Harris and Morgan[14] have produced syhilitic orchitis in rabbits by the inoculation of a saline suspension of macerated human gastric wall of a lesion in which spiral objects, seen in sections, could not be identified as treponema pallida.

In the literature generalizations and classifications of the pathological anatomy of syphilis of the stomach are much more readily found than descriptions of the lesion in individual cases. It seems that there may be either a diffuse or a localized granulomatous induration of the wall, producing a linitis plastica type of stomach in the diffuse form, and stenoses or contrictions with or without ulceration in the localized form. Such changes are mentioned by Smithies,[5] McNee,[3] Singer and Dyas,[4] Kaufmann,[6] Windhozl,[7] Derman and Kopelowitsch,[8] Eustermann,[9] LeWald,[10] O'Leary,[2] Karsner,[11] and MacCallum.[12] Smithies also mentions a perigastritis. The granulomatous lesions occupy the submucosa chiefly, although all strata of the wall may be involved. Gummata or gummatoid areas may be embraced; perivascular aggregations of lymphocytes and plasma cells are conspicuous; obliterating vasculitis is mentioned. It is said that gummatous nodules may coalesce to form larger lesions and that ulcers are produced by sloughing of

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XUM

the overlying mucosa. Such ulcers may be single or multiple.

A pyloric localization of the lesion is prominent among the reported cases, sometimes with stenosis and retention. MacCallum states that the ulcerations may extend into the duodenum. Kaufmann, Eustermann, LeWald, and MacCallum point out that the ulcerative lesions are readily distinguished from the ordinary round chronic peptic ulcer. LeWald, on the basis of X-ray studies, states that they are always more extensive than the ordinary ulcers. In addition to being more extensive, descriptions and illustrations of the few individual cases reveal the ulcers to be markedly irregular in shape. A dumb-bell-like appearance may be produced by a localization of the lesion in the middle of the stomach.

The clinical effects of these lesions throughout various reports are fairly uniform. A vague gastric disturbance becomes marked and progressive. The most constant feature is either achlorhydria or subacidity. The thickened and indurated pylorus frequently presents itself as a palpable mass in the epigastrium. Such cases are apt to have a partial pyloric obstruction with retention. Pain, nausea, vomiting, anorexia, cachexia, and variable degrees of gastric hemorrhage are less prominent features. Eustermann places the average duration of symptoms at two years.

Report of Cases

In the following four cases either the stomach or a resected portion thereof was available for study. In each of the first three resection of the pylorus was performed. The fourth case was studied at autopsy.

Case 1. A colored man, 51 years of age, admitted to St. Philip Hospital August 20, 1931, had had pain in the abdomen of four months' duration, associated with nausea and vomiting during the last three months. Blood had been present in vomitus and in stools. He had lost twenty-five pounds in weight during the four months. There was a palpable mass, not tender, in the epigastrium. Free hydrochloric acid was not present in the gastric contents. The Wassermann reaction of the blood was strongly positive. The last report, thirteen months after resection, indicates the patient to be working and apparently well.

The Gastric Lesion. The tissue removed at resection consisted of the distal 8 cm. of the stomach continuous with 2 cm. of duodenum. The indurated fibromuscular wall varied between 7 and 11 mm. in thickness, the submucosa constituting approximately one-half. The inner surface presented an annular ulcer, 3 to 6½ cm. long, proximally having a very irregular margin composed of markedly thickened, lobular-appearing gastric mucosa, and distally limited by the mucosa of the beginning of the duodenum, at the pyloric orifice, where the circumference was 4 cm. The base of the ulcer was smooth and grayish-brown; it lay in the more superficial portion of the submucosal stratum.

The floor of the ulcer was composed of a thin layer of necrotic cellular debris, overlying young granulation tissue densely infiltrated with lymphocytes, plasma cells, and fewer polymorphonuclear leucocytes, in part interwoven with the muscularis mucosae. Several gummatoid areas were observed, but no classical gummata. Beneath, the increased thickness of the submucosa was due to edema, fibroblastic proliferation, and dense, well circumscribed, perivascular and perilymphatic aggregations of lymphocytes and plasma cells. These sharply defined perivascular groups constituted the most constant feature of the histopathology. They extended throughout the wall of the stomach, through the hypertrophied musculature into the serosa, and also far beyond the margin of the ulcer, presenting a greater extent of inflammatory response than is usual in non-specific inflammation. They occurred partly as mantles about the blood vessels, and partly as eccentric nodules associated with the adventitia.

For the most part the blood vessels themselves were not altered, although in a few instances both arterioles and venules had narrow lumina and thickened walls, effected by medial hypertrophy and fibroblastic proliferations involving intima, media and adventitia; in some instances inflammatory infiltration of the vessel wall itself occurred.

The margin of the ulcer was abrupt in some areas, composed of intact, edematous, hyperplastic mucosa infiltrated with plasma cells and lymphocytes. In other portions such a mucosal border was separated from the ulcer proper by a narrow tapering zone in which the superficial half of the mucosa was necrotic, ragged, and mixed with inflammatory exudate.

Case 2. A colored woman, 26 years of age, admitted to St. Philip Hospital, August 17, 1931, complained of a dull, vague abdominal

pain after eating; the duration was one year. Occasionally the pains were followed by vomiting. There were periods during which she would be free from symptoms. There was no free hydrochloric acid in the gastric contents.

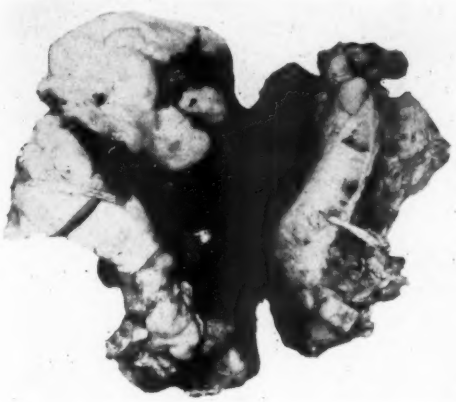

Fig. 1.—Case 2. Pylorus and portion of duodenum removed at resection, opened and spread apart, with all of the inner surface and cross section of the wall exposed. The shaded portion represents the ulcerated surface, which is seen to occupy the circumference, with the proximal margin irregular in contour. The wall is markedly thickened.

The Wassermann reaction was negative. The date of the pyloric resection was August 29, 1931. Thirteen months have elapsed; the patient is reported to be well.

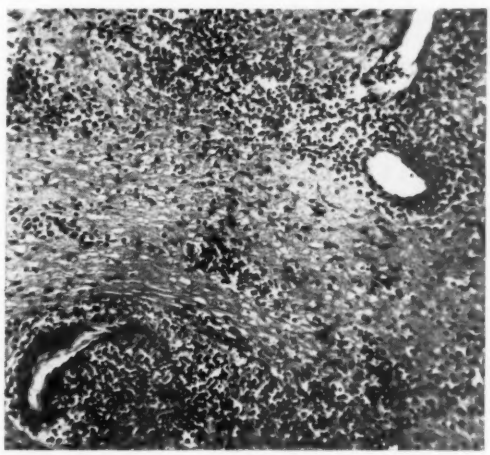

Fig. 2.—Case 2. Submucosa. Edema and perivascular aggregations of lymphocytes and plasma cells. A small giant cell is seen in the large, eccentrically situated group.

The Gastric Lesion. The specimen consisted of the pylorus of a stomach, 6 cm. long along the greater curvature and 4 cm. along the lesser, continuous with 2 cm. of duodenum. A rather shallow ulceration, very irregular in shape, 3 to 7½ cm. long, extended throughout the length of the specimen and completely around the circumference of the pyloric orifice, involving both stomach and duodenum. The base of the ulcer, lying at a level just external to the muscularis mucosae, was flat, smooth, mucoid to palpation and grayish-red in color, streaked with a grayish-white film of necrotic debris. The irregular margin consisted of abruptly rising, swollen, gray mucosa. The markedly indurated wall varied between 8 and 12 mm. in thickness.

Microscopically, the structure was the same in character, with the same distribution of its features, as in Case 1. It differed, however, in degree, the inflammatory response being more pronounced. Edema of the submucosa was extreme. An occasional solitary miliary gumma was found in the muscular strata.

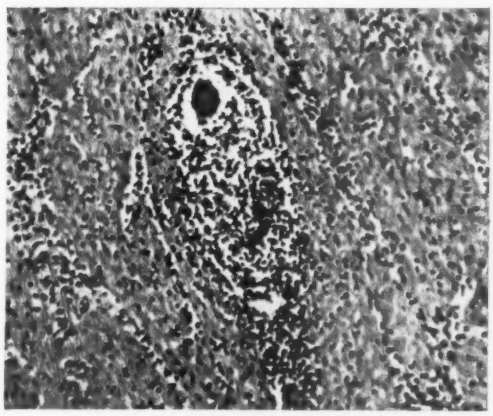

Fig. 3.—Case 2. Small gumma in muscular strata.

Bulky, well demarcated, compact masses of plasma cells and fewer lymphocytes, occurring anywhere in the wall, embraced gummatoid areas (somewhat ill-defined foci of a few epithelioid cells or macrophage histiocytes, with or without necrosis or a small giant cell). Vascular endothelial hyperplasia of capillaries and endarteritic alteration of arterioles were more marked than in the preceding case.

In a few lymph nodes, removed from the gastro-hepatic omentum at the time of operation, gummata having bulky achromatic necrotic centers occurred.

Case 3. A report of this case has been published by Dr. LaRoque and Dr. Shiflett[13] in the August, 1932, issue of *Annals of Surgery.*

A colored man, 23 years of age, had symp-

XUM

toms of vague gastric distress over a period of fourteen months. He was admitted to St. Philip Hospital on March 19, 1931, in a state of shock, after vomiting a large quantity of blood. His hemoglobin was 18 per cent and his red cell count 1,110,000. Two days later the hemoglobin was 11 per cent and the red cell count 890,000. The Wassermann reaction was positive. He was treated for secondary anemia and for syphilis, and discharged on May 28th with a hemoglobin of 62 per cent and a red cell count of 3,580,000. The total acidity of the gastric juice was 28° with free hydrochloric acid of 14°.

The patient was readmitted on November 11, 1931, because of vomiting of blood on the previous night, following abdominal pain and nausea of three days' duration. Roentgenological studies led to an impression of gastric syphilis with ulcer, hypertrophy of the gastric mucosa, and the presence of a pedunculated tumor of the stomach which at times prolapsed through the pyloric orifice into the duodenum.

Resection of the stomach was performed on November 18, 1931. Four months after operation a roentgenological examination indicated the gastric function to be satisfactory, with the stomach and site of anastomosis free from defects.

The Gastric Lesion. The specimen consisted of the pylorus of a stomach, 6 cm. long, 10 cm. in circumference at the proximal extremity, and 3 cm. in circumference at the distal extremity, the latter apparently coinciding with the pyloric orifice. The inner surface presented a "U" shaped ulcer, superficially appearing to be two discrete ulcers, with the limbs of the "U" 3 and 3½ cm. long, respectively, and both 1½ cm. in greatest width. The margin of the ulcer was of irregular contour and consisted of sharply demarcated thickened mucosa, which partly overhung the smooth flat base. The two arms of the ulcer were separated by a prominent perforated ridge of lobulated hypertrophic mucosa, 2½ cm. high, which was continued beyond the distal extremity of the specimen as a polypoid mass 2½ cm. in diameter. This overhung and concealed the zone of ulcerated surface which joined the limbs of the U and lined in annular fashion the pyloric orifice. The wall was markedly indurated with an average thickness of 1 cm.

The histology of the lesion was essentially the same as that in the two preceding cases. A dense wall of plasma cells and lymphocytes in a granulation tissue matrix bordered the ulcer, with bulky focal perivascular aggregations throughout the wall. Some foci had gummatous features. The thickened mucosal margin presented glandular hyperplasia and inflammatory infiltration. The submucosa was strikingly edematous. Changes in blood vessels were not pronounced.

Case 4. An obese white woman, 37 years of age, had had persistent nausea and vomiting for six months prior to admission. During this period she had lost 100 pounds in weight. The Wassermann reaction was positive. She had been given dilute hydrochloric acid for achlorhydria. Intravenous injections of salvarsan were begun three weeks prior to admission. She also received a course of mercury over a period of approximately three weeks. At operation a diagnosis of pylorospasm was made; a posterior gastrojejunostomy was performed. The patient became distended, and despite jejunostomy died thirteen days after the first operation.

The autopsy was limited to an examination of the abdomen. Stomach and duodenum were distended. There was an acute interstitial inflammation of a Meckel's diverticulum. Liver, kidneys and adrenal glands presented marked toxic degenerative alteration. A group of gummata several centimeters in diameter occurred in the left lobe of the liver.

The Gastric Lesion. An ill-defined shallow ulceration occupied the circumference of the pyloric orifice and extended proximally a distance of 4 cm. The distal or duodenal edge was not well demarcated. The proximal margin was irregular in outline and composed of gastric mucosa scarcely elevated above the base of the ulcer. The base was smooth and hyperemic. The maximum thickness of the indurated wall at the site was 11 mm. The circumference of the pyloric orifice was 15 mm. A small shallow ulcer of similar character, but without appreciable induration of the wall, occupied a portion of the mucosa at the cardia.

On microscopical study the shallow ulceration was found to be limited to the mucosa. The dense inflammatory infiltration present in the preceding cases was lacking here, yet perivascular groups of lymphocytes and plasma cells associated with fibrous tissue proliferation occurred throughout the thickness of the wall. The submucosa was not edematous, the

intact mucosal margin not hyperplastic, and the musculature only moderately hypertrophied.

Comment

The criteria on which diagnoses of syphilis of the stomach were made in these four cases are: (1) clinical courses typical of those generally accepted as characteristic of gastric syphilis; (2) achlorhydria in three cases, subacidity in the fourth; (3) a positive Wassermann reaction in all except Case 2, in which case syphilitic infection was manifest in the presence of classical gummata in perigastric lymph nodes; (4) an associated gastric lesion of structural features constant in all cases, features not characteristic of other known lesions of the stomach. but histologically characteristic of syphilis.

As pointed out by Warthin, the characteristic lesion of tertiary syphilis consists of perivascular aggregations of plasma cells and lymphocytes associated with fibrous tisue proliferation. Such lesions are not pathognomonic of syphilis, yet, with increasing experience, differences in degree, composition and disposition can be detected between the average syphilitic and the average non-specific lesion. The gumma is the classical lesion of tertiary syphilis, but not the characteristic lesion.

Difficulties in distinguishing a gumma from a tubercle are recognized; yet, in the cases herein reported, the sparsity of gummata, the absence of a structural disintegrative type of necrosis, and the paucity and small size of giant cells suggest a non-tuberculous nature.

Fungi were not observed. There was no indication of neoplastic disease.

In all four cases the lesion consisted of a shallow ulceration of irregular outline, several centimeters in diameter, located at the pylorus with annular involvement of the orifice, sometimes continued into the duodenum. Bordering mucosa usually was hyperplastic and edematous. The wall at the site was thickened and indurated. The annular shape of the lesion with irregular margin, distinct from the smaller, round, deep, peptic ulcer, conforms with the configuration assumed by syphilitic lesions of the intestines, including rectal strictures.

Conclusions

The characteristic ulcerative syphilitic lesion of the stomach is extensive, shallow, and of irregular shape, suggesting confluence of multiple ulcers or extension of one. There is marked induration of the wall at the site, and the mucosal border usually is conspicuously hyperplastic. The favorite site of localization is the pylorus, with annular ulceration of the orifice, the induration, consequent rigidity and narrowing leading to partial obstruction. The histologic structure is that of response to syphilitic infection. The gross features are more distinctive than the microscopic.

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Discussion

Dr. S. W. Budd, *Richmond:* Pathologists are all not agreed as to syphilis of the stomach. There are two very definite schools of thought as to what constitutes gastric syphilis. To one Dr. Pusch belongs and to the other I belong. I felt very much complimented when Dr. Pusch asked me to discuss his paper.

The conservative element amongst pathologists have built barriers around gastric syphilis, so that very few cases are able to enter; while the liberals, of which Dr. Pusch evidently is one, have let down the bars and have admitted a large number of cases of gastric syphilis.

To date we have never been able to demonstrate satisfactorily the Spirocheta pallida in syphilis of the stomach. This is not an unusual state of affairs, because we are seldom able to demonstrate the Spirocheta pallida in syphilis of other tissues. To find them we have to look in congenital syphilis. They are present in the livers of congenital syphilitics in great numbers. Recently, Harris described a spirochete which he could not definitely identify as the Spirocheta pallida. So far, a definite gumma has never been demonstrated in gastric lesions. I am glad that Dr. Pusch calls his lesion "gummatoid." It is a lesion which simulates gumma. Harris has shown that, although he was not able to demonstrate the Spirocheta pallida, he could produce a syphilitic orchitis by inoculating the testicle of a rabbit with material from an ulcer of the stomach.

I wish to compliment Dr. Pusch upon the manner in which he has presented his case. He has cer-

tainly made his cases fit within the dictum prescribed by Warthin. That syphilis of the stomach does exist is attested by the fact that so many of our cases under treatment for syphilis will have a disappearance of their stomach symptoms. Only yesterday I was talking to a gentleman of our profession who said he has treated six cases of syphilis of the stomach with antisyphilitic remedies and that all have gotten well. The fact that Harris has demonstrated that syphilis of the stomach exists, even though we cannot demonstrate the spirochete in the tissues, and that we are getting therapeutic effects from our treatment for syphilis, makes us think this disease may exist more frequently than we of the conservative element admit.

In conclusion, I should like to say that a positive Wassermann test is very treacherous in any lesion of the stomach. We may lose valuable time while we are waiting for the therapeutic effects of antileutic remedies if the patient has a cancer and not syphilis. If we have a suspicious lesion of the stomach, I think we should have an exploratory operation, because a delay of several weeks or months may lead to very serious consequences.

DELIVERY.*

HENRY J. LANGSTON, M. D., Danville, Va.

In reviewing literature we find that the earliest description of labor and delivery is reported in the Old Testament. I desire to quote the first recorded delivery which resulted in a live baby and death for the mother:

"And they journeyed from Bethel; and there was still some distance to come to Ephrath: and Rachel travailed, and she had hard labor.

"And it came to pass, when she was in hard labor, that the midwife said unto her, Fear not; for now thou shalt have another son.

"And it came to pass, as her soul was departing (for she died), that she called his name Benoni: but his father called him Benjamin.

"And Rachel died, and was buried in the way to Ephrath (the same is Bethlehem).

"And Jacob set up a pillar upon her grave: the same is the pillar of Rachel's grave unto this day." Genesis. Chap. 35; Verses 16-20.

It would be interesting and worthwhile knowing, were we in a position to report accurately, the number of deaths to young women resulting from pregnancy, labor and the complications connected therewith which have occurred since the beginning of human existence; also, it would be of great scientific interest were we able to paint a picture representing the morbidities and invalidism which were primarily caused by the processes of pregnancy and the forces of labor. Certainly the number of women who have fallen prematurely by the wayside as a result of labor during the world's history would mount into millions. The women who have pathological conditions which necessitate one form or another of operation in the pelvis number many more millions than those who have prematurely died as a result of labor. I desire to get this picture in our minds so that it may offer to us a challenge to develop every scientific fact possible to make labor less dangerous and to prevent not only deaths but the many and varied pathological conditions which follow labor.

In order that we may profit most by this discussion, I desire to group the various types of deliveries so that we may discuss them in a manner which will enable us to manage each case as nearly as possible successfully. In this connection I also want to say that it is impossible to standardize the principles of obstetrics. As a matter of fact, the probabilities are that the reason we have made no more progress in this most important field is that our teachings and writings have been more or less given to us in a stereotyped manner.

We are assuming that our cases for delivery have been properly measured, properly studied and that the hour of labor has arrived. If we have all the facts of the case at our finger tips and we know our patient in a thorough-going manner, we are now ready for the delivery.

First: The Non-Operative Cases. There are two things essential for a satisfactory delivery. The doctor should know thoroughly the details of delivery and his patient, and the patient should have confidence in her doctor. As labor begins the patient should be prepared for delivery in the following manner: The big intestine should be thoroughly emptied with a high warm soda enema, or any kind of enema, depending upon which is preferred by the doctor. The genitals should be shaved or clipped. If the patient is to be delivered at home, her bed should be properly prepared. As labor advances, every effort should be put forth to make the patient comfortable and calm. It is my opinion that after the doctor is certain that the position of the baby is normal, that the birth canal is large enough for the passage of the baby, and that there are apparently no difficulties facing the forces of labor, he should then use freely any one or a combination of drugs to eliminate as far as possible the agonizing pains and the tortures of labor to the patient. After labor has advanced to the point where the lower uterine

*Read before the South Piedmont Medical Society, November 22, 1932.

segment has been effaced, the internal os is well dilated and the external os is dilated the size of a silver dollar, then the physician can use to a great advantage rectal analgesia of ether oil, or he can use large doses of sodium amytal. These drugs will not effect very much the progress of labor and after a few hours it will be discovered that the cervix is fully dilated, the head is engaged in the superior strait, and is passing down through the mid strait. As the head advances and is down on the perineum, the patient can now be given ether by the drop method and put almost completely to sleep. The vagina can be gently ironed out, and in this manner the second stage of labor can be markedly shortened, this assistance to the patient being always appreciated. In the meantime, it is much safer for the baby if, while this is going on, very close attention is paid to the heart sounds of the baby. It is my opinion that many babies perish while passing through the second stage of labor due to the fact that the attending physician pays too little attention to the baby. Also, another point we need to emphasize, because of its importance to the patient, is, as you get ready for the second stage of labor, the bladder of the patient should be emptied with a soft rubber catheter. Now that the head is down on the perineum and is almost ready to be delivered, support should be given to it to prevent too rapid advance, because, if it advances in an extremely rapid manner, we get extensive tears not only of the perineum but of the cervix. As the head is being delivered the patient should be completely anesthetized to keep the voluntary muscles thoroughly relaxed. From this point on abundance of time should be taken to deliver the trunk of the baby. It is rarely ever necessary to use any pulling on the head of the baby to deliver the trunk. Now that the baby is delivered, it should be allowed to rest on the abdomen of the mother and the vagina should be inspected.

Whatever damage is done to the birth canal in a normal delivery will be considered later in our discussion. There is a good deal of debate as to when the cord should be severed. There is one group of men who have studied the question very seriously who think that the cord should be severed immediately. Another group feels that the cord should be severed at the end of five minutes. Many observations have been made as to the advantages and disadvantages of both of these methods. The probabilities are it would be better to consider each case from the standpoint of severing the cord rather than making a hard and fast rule as to when the cord should be severed. Plenty of time should be taken for the expulsion of the placenta. Hurry at this point has many times caused complications which could have been avoided if proper time and consideration had been taken. After the placenta has been expelled, patient should be thoroughly cleaned, abdominal binder and proper pads applied. The pads should be made tight so as to produce pressure against the vulva.

Second: Operative Deliveries. In considering operative deliveries I desire to group the conditions so that certain fundamental principles in these conditions may be observed. First, the abnormal presentations with reference to the baby and abnormal position of the cord. In considering these abnormal positions we are assuming that the birth canal is of moderate size so that there is no doubt in mind about the passage of baby through the birth canal. Transverse position, breech, occiput posterior, prolapsed hand, prolapsed cord and presentation of feet are conditions which demand, in my judgment, assistance, so that we may avoid complications which may result in the death of baby and marked damage to the birth canal later in labor. After a most careful study of various methods and my own experience, I have found that the following procedure has made it possible for me to bring my still-births down to less than 2 per cent. Patients with such conditions I transfer immediately to the hospital where they are properly prepared for delivery. Then, I transfer them to the delivery room and, without giving anesthesia, if the cord is prolapsed, or the hand is prolapsed, I put them back into the uterine cavity under strictly aseptic conditions. Then I insert into the cervical canal a size 6 Voorhees' bag. This bag is filled with sterile water. When it is completely filled I use two ordinary hemostats instead of a ligature on the neck of the bag. Patient is now removed to her bed and a little weight varying from one pound to two pounds is attached. From this point on the patient is watched carefully and kept comfortable by the use of morphin, hyoscin, atropin and rectal analgesia. There is no danger to the baby now. The bag is watched carefully. As soon as the cervix is completely dilated, the patient is removed to the delivery room and,

XUM

if the rectal analgesia has not completely anesthetized her, she is given ether by the drop method. She is now thoroughly cleaned with sterile water and soap; bladder is emptied with a catheter, then the bag is removed by first letting out the water. Patient is draped, each leg is supported by a nurse, the vagina is thoroughly ironed out. I always use elbow gloves, then by the use of Potter's technic I go up into the uterine cavity and seize both feet in the case where the head is presenting and the baby is turned around and delivered gently and slowly and carefully. As much time as the case requires can be taken without any real danger to baby in delivering it. The trunk is delivered slowly and gently by very little traction and much manipulation. The shoulders are delivered by first delivering the anterior and then rotating the posterior anteriorly and then delivering it. With the free hand the condition of the head of baby is now examined. If there is no evidence of the cervix trying to clamp down on the head, with the baby riding on the arm and hand and the fingers pressing on the chin of baby, the patient's legs are lowered to about 15 degrees below the body. With the free hand gentle pressure is made over the occiput and, keeping the baby's head flexed, if there are no disproportions in the birth canal, the head slips through the superior strait. Now, if there is a marked tightness of the head in the vagina, instead of pulling on the baby's neck to deliver the head, the baby's body is brought almost perpendicular to the body of the mother and Piper forceps are applied to the head. Then allow the baby's body to ride on top of the forceps. With gentle flexion by use of the forceps and at the same time a moderate amount of traction, put a little bit of traction on the neck of the baby by grasping the baby by the back of the neck, using the shoulders for leverage, and the head is slowly and gently delivered. At the same time all secretions are kept from the mouth and throat of baby. Baby is then placed upon abdomen of the mother and abundance of time is taken for the expulsion of the placenta.

In cases of occiput posterior positions where the bag has not been used, after complete dilatation of the cervix and the head fails to engage in the superior strait, I find it wise to take these patients to the delivery room, put them to sleep, and use the same care with reference to technic in cleanliness. With the Kielland forceps rotate baby's head from the occiput posterior to the occiput anterior. When this is done, allow the forces of nature to drive the baby's head down in the mid strait. At this point Kielland forceps are applied and with gentle traction and manipulation the baby is delivered slowly and carefully.

Placenta Previa Marginalis: If labor is active and vigorous and there is no marked evidence of bleeding, it is well to allow these patients to go on into so-called normal labor. If, on the other hand, there is some bleeding, I use the Voorhees' bag in the same manner as described above, for two reasons. First, to control hemorrhage, and, second, to shorten the first stage of labor. As soon as the cervix is completely dilated I use the same technic for delivery as described above.

Conditions which require delivery by some other method than by the birth canal are these: Placenta centralis, previa, dystocia of the cervix, disproportion between the birth canal and baby, markedly contracted pelvis, abruptio placenta, hydrocephalus, and normal size birth canal with an abnormally large baby. There may be other conditions which would require Cesarean section, but we believe the above are the ones that should be considered. The technic for Cesarean section is unnecessary to describe, for we feel that men who are doing obstetrics have acquainted themselves with the principles sufficiently to cause us to proceed with two or three points which we believe are wise to think over. The first one is the preparation for Cesarean section. Such cases as we have named should not be forced to go through the experience of the test of labor, because, if there is anything to the use of measuring instruments, I believe that physicians can determine without the test of labor what the procedure should be. If possible, with these conditions facing us, carry the patient almost to the hour of labor, then transfer her to the hospital and prepare her carfeully for what I regard as the biggest and most dangerous operation which we have to perform today, because, after I have studied the records of a large number of clinics and some of the best men in the country, I find that the opportunity for a patient to get well and live when she has to have a Cesarean section is six times less than by being delivered by the birth canal. After the patient has been prepared for operation, the form of anesthesia should be considered. If she has a good heart and good lungs and her blood pressure is within the range of

normal, ether is as safe as any anesthetic; also spinal anesthesia may be used. When this has been settled, avoid giving a hypodermic of morphin and atropin before operation. I believe many babies have their respiratory center paralyzed by the use of morphin in Cesarean section, and as Cesarean section is performed quickly, the baby has a way of absorbing so much morphin that it has difficulty in breathing. With patient anesthetized, the technic for Cesarean section is to be considered. Some men like to follow DeLee's principles of Cesarean section, and they have obtained wonderful results; some men like to do the classical Cesarean section, and they have obtained fair results. I personally prefer to do a low Cesarean or a Cesarean above the umbilicus. In some ways I have had better results by doing a Cesarean above the umbilicus, opening the fundus high. In these cases you can use a very short incision both in the uterus and in the abdomen. I locate the feet of the baby after the uterus is opened and use the same technic in getting the baby out of the uterus as I do in delivering the baby by version. After the baby is delivered, take plenty of time to deliver the afterbirth. You give the uterine muscles, a chance to contract physiologically so that you have the minimum danger of hemorrhage. As the abdomen is being opened in Cesarean section, I usually administer one ampule of pituitrin hypodermically. After the placenta is delivered, the uterus is closed by three layers of sutures, all of them continuous; the last layer of suture is plain catgut and the incision in the uterus is completely covered by peritoneum. Abdomen is closed in the usual manner. These patients should be treated freely by the use of morphin.

There is one question here of a debatable nature, and that is with reference to the appendix—whether or not it should be removed. In Cesarean section I always remove the appendix and I have had no bad results. I believe it is a wise step to take, for it saves many of these patients subsequent operations.

Prophylactic Forceps. In my experience I have found that the principles governing the notion of prophylactic forceps is a real advantage to both baby and mother. These patients can be completely anesthetized, forceps can be applied, and with gentle traction the baby can be delivered very slowly, frequently saving extensive tears and also saving any embarrassment which the baby may have in the birth canal.

The complications that we encounter in labor aside from hemorrhage may be briefly considered. They are pyelitis, nephritis, gallbladder disease, pulmonary tuberculosis, myocarditis with a decompensating heart, and so on. Such conditions must be considered not as a group but as individual cases. All these cases should be assisted in labor in the very best possible way, depending upon the patient and upon the notions the physician himself has. The eclamptic cases I have purposely omitted under the question of Cesarean section because I believe, after one studies the results of a large group of cases, that conservative, painstaking and careful obstetrical principles which may be followed, will result in more live babies and live mothers than Cesarean section, provided there are no disproportions with reference to the baby in the birth canal.

Briefly, I would like to consider the care of the birth canal immediately following delivery. As you probably know, I wrote a paper on this subject and presented it at the Tri-State Medical Society in February, 1929. Since that time I have repaired many birth canals of old lacerations, both of the perineum and of the cervix, and I have repaired many fresh lacerations. In checking over my results, I find that they are 95 per cent satisfactory from the standpoint of function. I have obtained perfect results from the standpoint of cosmetics. I would like to emphasize two or three points with reference to inspection of the birth canal. I personally have delivered a good many babies, and when I looked at the vulva after delivery I would say there was no damage done, but by putting my hand into the vagina and spreading the parts I have discovered tears on one and sometimes both sides of the vaginal wall. In normal deliveries I pull the cervix down, hoping to find no tear in the cervix, and have discovered that there was a tear on each side of the cervix from ¼ to ¾ inch long. If these tears are left unrepaired, you have a hypertrophied cervix following delivery. If the vagina is left unrepaired, you have either on one side or both sides of the vagina a sunken area; that is to say, if you open the vagina with a bi-valvular speculum and look along each side of the vagina, you will find a hollow space which would allow one to place in some cases a small hen egg, and still these hollow spaces would not be filled. These hollow spaces,

if left, cause a marked relaxation of the vagina which results in various degrees of retrodisplacement of the pelvic organs with a more or less marked cystocele and rectocele. I believe if more of us would inspect the vagina from the cervix out, you would find that your experience will coincide with the observations which I have made. Also, if these lacerations are left unrepaired, there is a lot of unnecessary pressure on the levator ani muscles. These in turn produce a dysfunction in these muscles and the patient is brought to the gynecologist or the general surgeon for what I regard as unnecessary operations with all the unnecessary expenses and suffering which should have been prevented.

Conclusions

In this paper I have tried to avoid setting forth any radical notions about the management of delivery. I have emphasized, first, the importance of considering each case as a universe unto itself, and each physician is to be his own judge as to how he will manage his patient in labor.

Secondly, I have emphasized the importance of most carefully observing all the rules of cleanliness.

Third, the importance of constructive obstetrics is likewise emphasized, avoiding injury to baby and doing as little damage as possible to the birth canal. Whatever damage is done to the birth canal is repaired at the time of delivery.

Fourth, I have not in detail discussed the question of taking care of and resuscitating the baby after delivery, but the principles observed here must be these: Keep the baby thoroughly warm; keep all secretions removed from the mouth and esophagus and trachea, and, if baby has to be resuscitated, use gentleness and care. In my experience I find that using a catheter in the trachea and taking a sterile piece of gauze and putting it over the mouth of the baby when breathing into the baby's lungs have gotten the best success and most satisfaction.

Fifth, we should get away from our sterotyped notion of obstetrics and see the waste that is occurring annually in our country in this particular field. I believe that by cooperation and study we can make greater advance than by following practices. Some doctors have been criticized for what they have done, but we must find out why they do it and what are their results. Then we can be governed by the facts rather than by traditional notions and hearsays.

EARLY PHASES OF LOCOMOTOR ATAXIA.

H. COLLES GRANT, M. D., Remington, Va.

The confusion between tabes dorsalis in its pre-ataxic stage and manic depressive insanity is one which is confusing both to the laity and to the profession at large. Especially if one is looking for a mental disorder and forgetful of the spinal cord lesions, is this likely to occur.

In the pre-ataxic stage the symptoms vary a great deal. But often an excess of stimulation of the generative function precedes all other symptoms, followed in a few months by impotence. This may give the patient a feeling of well-being which simulates the manic state in manic depressive insanity.

Lightning pains may or may not be present. At about this time a slight failure of balance may be noticed. The patient cannot maintain equilibrium when standing on one foot, and with the eyes closed and the feet together a slight swaying motion is felt, rather than seen. Contrary to most textbooks, I have not observed the Argyll-Robertson pupil as an early symptom. There is, however, a gradual lessening of vision, due to optic atrophy, which often ends in blindness.

The urine is noticeably increased, and a man who has not been in the habit of voiding during the night is obliged to void frequently. Frequent emptying of the bladder is important, as it fends off the consequent distention of that organ.

The mental faculties gradually deteriorate, beginning with forgetfulness, aphasia, and so-called absent-mindedness. A period of restlessness is an early symptom.

The hands gradually develop a numb feeling, and small objects are hard to pick up. This is followed by the feeling as if a glove covered the hand.

It is at this point that a diagnosis of insanity is often made by the family and confirmed by the physician. These unfortunate people gradually go into the ataxic stage, which is easily recognized, and diagnosed as such, but not before the stigma of having been an inmate of some mental or psychopathic hospital is hooked on to them.

Special Report

MATERNAL MORTALITY IN VIRGINIA IN 1927 AND 1928.

A Report to The Medical Society of Virginia and to The Virginia State Department of Health.

FRANCES C. ROTHERT, M. D., U. S. Children's Bureau.

EDITOR'S NOTE:—The study for this report on Maternal Mortality in the State of Virginia was undertaken by the Children's Bureau, U. S. Department of Labor, under the direction of Grace Abbott, Chief The inquiry was begun in 1927 and completed in 1928, this study having been requested by the Medical Society of Virginia in 1927. It contains valuable facts on this most important subject and is published in the MONTHLY upon request of Dr. Warren F. Draper, State Health Commissioner, and Dr. Greer Baughman, member of the Committee on Maternal Welfare. It is proposed to have this report also reprinted in pamphlet form.

METHOD OF STUDY

In February, 1927, the United States Children's Bureau, at the request of the Virginia State Department of Health and of the Medical Society of Virginia, and with their help, began a study of maternal mortality in Virginia. This study and similar studies in fourteen other States were made according to a plan worked out in the United States Children's Bureau with the assistance of the bureau's obstetrical advisory committee.

In Virginia in 1927 and 1928 the United States Bureau of the Census assigned 783 deaths to the group of causes "the puerperal state." This includes all deaths found to be due primarily to pregnancy and childbirth, in accordance with the International List of Causes of Death. (The revision of 1920 was used, as this was in force at the time the deaths occurred.) Deaths which were due to other causes but in which pregnancy or childbirth was a contributory factor were not included. Death certificates showing both puerperal and nonpuerperal causes are classified as puerperal or nonpuerperal according to the rules published by the Bureau of the Census in the Manual of Joint Causes of Death which follow, in the main, international practice [1]

Copies of the 783 death certificates were obtained from the Bureau of Vital Statistics of the State Department of Health, also copies of the birth certificates of the children born to these mothers. The physicians and midwives who had signed the certificates were interviewed by physicians on the staff of the Children's Bureau, who worked in close contact with the State Department of Health and with the president of the Medical Society of Virginia.[2] If the patient had been in a hospital the hospital also was visited; and, with permission from the attending physician, the patient's chart was consulted. The physicians of the State were exceedingly generous in giving time and information for this study. The tabulation of the findings has been done in the Children's Bureau.

1. Manual of Joint Causes of Death, Showing Assignment to the Preferred Title of the International List of Causes of Death When Two Causes Are Simultaneously Reported. U. S. Bureau of the Census. Washington, 1925.

2. Dr. Margaret Swigart, Dr. Frances M. Hennessy, Dr. Janice Rafuse, and Dr. Frances C. Rothert were the interviewers.

MORTALITY RATES

As in the two years of the study, 783 deaths were certified to be due to puerperal causes, and there were 114,701 live births, the maternal mortality rate for the State for the period 1927 and 1928 was sixty-eight.

Tables 1 and 1a show the maternal mortality rates for the six years, 1924 to 1929, inclusive, for white and colored women and in the urban and rural areas of the State, as compared with similar rates in the United States birth-registration area as a whole during those same years.

TABLE 1

Trend of maternal mortality in urban and rural areas of Virginia and the United States birth registration area: 1924 to 1929

AREA	MATERNAL MORTALITY RATES*					
	1924	1925	1926	1927	1928	1929
Virginia:						
Total	65	70	80	62	75	71
Urban	100	95	123	104	121	100
Rural	56	63	67	50	62	62
United States birth registration area:						
Total	66	65	66	65	69	70
Urban	73	73	74	75	78	78
Rural	58	55	57	55	62	62

*Deaths from puerperal causes per 10,000 live births.

Since statements as to the amount of maternal mortality rest entirely on the reports of physicians, much depends on their accuracy in certification. In sixteen cases in this study the physician gave in the interview information which, if it had been placed on the original death certificates, would have caused the deaths to be classified as nonpuerperal, although pregnancy or childbirth was a contributory factor for fourteen of them. As only those deaths were studied that had been assigned to puerperal causes on the original death certificates (or that were added after answers had been received to the queries sent out by the State Bureau of Vital Statistics and by the United States Bureau of the Census to physicians who certified deaths as due to ill-defined causes), it is not known how many deaths that were actually puerperal were assigned to some other cause on account of deficient certification. These sixteen cases were excluded from all the accompanying tables except Tables 1 and 2. It is probable that the 783 is more nearly the actual number of deaths than 767, and even that number may be too small. The detailed study was based, however, on the 767 deaths found by interview to have been puerperal. Within the puerperal group seventy-eight changes in classification were made as a result of the interview with the attending physicians. A few of these were mere shifts from one to another subtitle in a main group of causes of death. These changes largely balanced one another, the most noticeable result being an increase from thirty-six to

forty in the percentage of deaths attributed to puerperal septicemia and a decrease from thirty-one to twenty-eight in the percentage of those attributed to puerperal albuminuria and convulsions.

Table 2 shows the number of deaths according to cause, their relation to the whole number of maternal deaths, and the rates per 10,000 live births in accordance with the information given on the death certificates and that obtained in the interview with the attending physician.

TABLE 1-A

Trend of maternal mortality among white and colored women in Virginia and the United States birth registration area: 1924 to 1929.

AREA	MATERNAL MORTALITY RATES*					
	1924	1925	1926	1927	1928	1929
Virginia:						
Total	65	70	80	62	75	71
White	50	53	71	48	59	52
Colored	100	110	100	94	114	116
United States birth registration area:						
Total	66	65	66	65	69	70
White	61	60	62	59	63	63
Colored	118	116	107	113	121	120

*Deaths from puerperal causes per 10,000 live births.

The causes of the 767 deaths as ascertained by interview with the attending physician were: puerperal septicemia, 304 (40 per cent); puerperal albuminuria and convulsions, 217 (28 per cent); puerperal hemorrhage, 81 (11 per cent); other accidents of labor, 72 (9 per cent); accidents of pregnancy, 69 (9 per cent); puerperal phlegmasia alba dolens, embolus, sudden death, 22 (3 per cent); and causes following childbirth not otherwise defined, 2.

Tables 3 and 4 show the number and per cent distribution of deaths attributed to the various causes in the urban and rural areas of the State and among the white and colored women. In the urban areas are included the eleven cities that had 10,000 or more inhabitants in 1920—Alexandria, Charlottesville, Danville, Lynchburg, Newport News, Norfolk, Petersburg, Portsmouth, Richmond, Roanoke, and Staunton; the remainder of the State is regarded as rural. Of the 767 deaths 276 occurred in these cities and 491 in the rural areas; 50 per cent of the 276 urban deaths were of white, 50 per cent of colored women; of the 491 rural deaths 288 were of white and 203 were of colored women. Puerperal septicemia caused 50 per cent of the urban white deaths, 48 per cent of the urban colored deaths, 35 per cent of the rural white deaths, and 33 per cent of the rural colored deaths. The percentage of deaths from puerperal albuminuria and convulsions was twenty-four among the urban white women, thirty-one among the urban colored, twenty-five among the rural white women and thirty-four among the rural colored. The maternal mortality rates were higher in the urban than in the rural areas for every puerperal cause except puerperal hemorrhage, which was the same for both urban and rural areas; and the rates for colored women were higher than those for white women for every puerperal cause except puerperal phlegmasia alba dolens, embolus, sudden death, which was the same for both races.

TABLE 2

Cause of death as given on death certificate and as shown by interview among women dying from puerperal causes in Virginia: 1927 and 1928

CAUSE OF DEATH	WOMEN DYING FROM—					
	Cause as Given on Death Certificate			Cause as Shown by Interview		
	Number	Per Cent Distribution	Rate Per 10,000 Live Births	Number	Per Cent Distribution	Rate Per 10,000 Live Births
Total	783	.....	.....	783	.....	.....
Puerperal	783	100	68	767	100	67
Accidents of pregnancy	79	10	7	69	9	6
Puerperal hemorrhage	80	10	7	81	11	7
Other accidents of labor	85	11	7	72	9	6
Puerperal septicemia	279	36	24	304	40	27
Puerperal phlegmasia alba dolens, embolus, sudden death	14	2	1	22	3	2
Puerperal albuminuria and convulsions	245	31	21	217	28	19
Following childbirth (not otherwise defined)	1	*	†	2	*	†
Puerperal diseases of the breast	.....	.....	.....	.....	.....	.....
Non-Puerperal	.....	.....	.....	16	.....	.....

*Less than one per cent.
†Less than one per 10,000 live births.

TABLE 3

Cause of death as shown by interview among women dying from puerperal causes in urban and rural areas of Virginia: 1927 and 1928

CAUSE OF DEATH AS SHOWN BY INTERVIEW	WOMEN DYING FROM PUERPERAL CAUSES								
	Total			Urban			Rural		
	Number	Per Cent Distribution	Rate Per 10,000 Live Births	Number	Per Cent Distribution	Rate Per 10,000 Live Births	Number	Per Cent Distribution	Rate Per 10,000 Live Births
Total	767	100	67	276	100	110	491	100	55
Accidents of pregnancy	69	9	6	23	8	9	46	9	5
Puerperal hemorrhage	81	11	7	17	6	7	64	13	7
Other accidents of labor	72	9	6	17	6	7	55	11	6
Puerperal septicemia	304	40	27	135	49	54	169	34	19
Puerperal phlegmasia alba dolens, embolus, sudden death	22	3	2	8	3	3	14	3	2
Puerperal albuminuria and convulsions	217	28	19	76	28	30	141	29	16
Following childbirth (not otherwise defined)	2	*	†	.....	.....	.....	2	*	†

*Less than one per cent.
†Less than 10,000 live births.

TABLE 4

Cause of death as shown by interview among white and colored women dying from puerperal causes in Virginia: 1927 and 1928

CAUSE OF DEATH AS SHOWN BY INTERVIEW	WOMEN DYING FROM PUERPERAL CAUSES								
	Total			White			Colored		
	Number	Per Cent Distribution	Rate Per 10,000 Live Births	Number	Per Cent Distribution	Rate Per 10,000 Live Births	Number	Per Cent Distribution	Rate Per 10,000 Live Births
Total	767	100	67	426	100	53	341	100	101
Accidents of pregnancy	69	9	6	38	9	5	31	9	9
Puerperal hemorrhage	81	11	7	50	12	6	31	9	9
Other accidents of labor	72	9	6	47	11	6	25	7	7
Puerperal septicemia	304	40	27	171	40	21	133	39	39
Puerperal phlegmasia alba dolens, embolus, sudden death	22	3	2	16	4	2	6	2	2
Puerperal albuminuria and convulsions	217	28	19	104	24	13	113	33	33
Following childbirth (not otherwise defined)	2	*	†	.....	.....	.....	2	1	1

*Less than one per cent.
†Less than one per 10,000 live births.

PERIOD OF GESTATION

Two hundred (26 per cent) of the 767 maternal deaths occurred before the last trimester of pregnancy was reached and 566 (74 per cent) after the last trimester was reached; the period of gestation of 1 woman was not reported. Of the 200 deaths before the last trimester was reached, 117 (59 per cent) were due to puerperal septicemia, 49 (25 per cent) to accidents of pregnancy, 32 (16 per cent) to puerperal albuminuria and convulsions, and 2 (1 per cent) to puerperal phlegmasia alba dolens, embolus, sudden death. Of the 566 deaths after the last trimester was reached, 187 (33 per cent) were due to puerperal septicemia, 184 (33 per cent) to puerperal albuminuria and convulsions, 81 (14 per cent) to puerperal hemorrhage, 72 (13 per cent) to other accidents of labor, 20 (4 per cent) to puerperal phlegmasia alba dolens, embolus, sudden death, and 2 to causes following childbirth not otherwise defined.

Abortion

Information concerning abortion (that is, the termination of a previable uterine pregnancy) was obtained for all except 1 of the 767 women who died from puerperal causes in the two years. Abortion preceded the deaths of 143 (19 per cent) of these women. These 143 deaths included 48 (6 per cent) following abortions said to have been spontaneous, 61 (8 per cent) following induced abortions and 10 (1 per cent) following therapeutic abortions; 24 (3 per cent) followed abortions of unreported type.

The 61 induced abortions include self-induced abortions and abortions that probably had been induced by some other person (criminal). Deaths shown on the death certificate to be due to criminal abortions are not included in the census classification, "Death from puerperal causes," and hence were not included in this study.[3] Abortions not certified as criminal were not excluded from this study, even though the attending physician was convinced that they were criminal, as in many cases it was impossible to determine whether the abortion was self-induced or criminal.

Of the 138 urban white deaths 41 (30 per cent) followed abortion; of the 138 urban colored deaths 33 (24 per cent) followed abortion. Forty-one (14 per cent) of the 288 rural white deaths and 28 (14 per cent) of the 202 rural colored deaths followed abortion. The percentage of induced abortions was higher among women who died in the urban than in the rural areas and higher among white than among colored women; but the percentage of deaths due to spontaneous abortion was higher among the colored women.

In Virginia in 1927 and 1928 there were 12 deaths of women following abortion to every 10,000 live births, as compared with a rate of 16 in the group of 15 States studied. Only two (Wisconsin and Minnesota) of the other States studied had lower rates, and one other (New Hampshire) had the same rate. The urban rate in Virginia was 29, however, as compared with an urban rate of 22 in the 15 States. The rural rate in Virginia was 8, as compared with a rural rate of 12 in the 15 States. The rate in the State for white women was 10 and for colored women 18, lower in both cases than the corresponding rates (15 and 21) for the 15 States.

Eighteen of the 143 women who died following abortions were single and 125 were married. The proportion of abortions that were induced was larger among the single women, than among the married women, 13 being induced, 3 spontaneous, and 1 therapeutic; the type of 1 was not reported. Of the 125 abortions among the married women 48 were induced, 45 spontaneous, and 9 therapeutic; the type of 23 was not reported.

Thirty-eight of the 143 women were primiparae and 101 were multiparae; the parity of 4 was not reported. Of the 38 abortions among primiparae 9 were spontaneous, 4 therapeutic, and 22 induced; the type of 3 was not reported; of the 101 among multiparae, 37 were spontaneous, 6 were therapeutic, and 38 induced; 20 were of unreported type.

Sixty-two of the 143 women were said to have had a curettage and 77 had no curettage; for 4 there was no report on this matter. Forty-four of the 62 women who had curettage, including 21 who had induced abortions, had fever before the curettage.

Puerperal septicemia caused the deaths of 109 of the 143 women who died following abortion. Their deaths constituted 36 per cent of all the deaths from puerperal septicemia in the State, and included 54 (18 per cent) following induced abortion, 31 (10 per cent) following spontaneous abortion, and 1 following therapeutic abortion; 23 (8 per cent) followed abortion of unreported type.

Ectopic Gestation

The deaths of 32 women were associated with ectopic gestation—13 in urban areas and 19 in rural areas, 15 white and 17 colored. All but two of these (both urban colored) died before the last trimester. Fifteen had had laparotomies, all but 1 before the last trimester. Another woman who had an 8-month abdominal pregnancy had had several attempts made to induce labor mechanically, and her condition was diagnosed when an attempt was made to deliver her by post-mortem section.

Live Births and Stillbirths

The result of the pregnancy was reported for 760 of the 767 women who died. Of the 760 women, 323 gave birth to single living children, 9 to live-born twins, and 2 to one live child and one stillborn of twins. Beside these 2 cases of stillbirth accompanying livebirth, stillbirths of more than 7 months' gestation resulted from 167 of the single pregnancies and 3 of the plural pregnancies; 173 women gave birth to previable children, and 83 died undelivered. Therefore these 767 pregnancies fatal to the mother resulted, so far as is known, in only 343 living children, and some of these probably died soon after birth.

Prenatal Care

It is generally agreed that through prenatal care the physician is able to surround pregnancy and childbirth with many safeguards that would otherwise be impossible. It was of particular interest to find out how many of the 767 women who died had had that advantage.

The 91 cases of induced abortion and cases in which pregnancy terminated before the third month were for obvious reasons excluded from the group for which prenatal care was studied, the phrase "prenatal care inapplicable" being used to describe them. In 49 cases no report on prenatal care could be obtained. The group for which prenatal care was studied consists, therefore, of 627 women.

Of these 627 women 377 (60 per cent) had no prenatal care whatever.

For the purposes of further study the care received by the 250 women who had had some medical supervision during their pregnancy was divided into grades as follows:

Grade I (good): Prenatal care consisting of at least (1) a general physical examination, including examination of heart, lungs, and abdomen; (2) pelvic measurements, external and internal, except in pregnancies terminating before the eighth month and for multiparae who had had a previous normal delivery; and (3) regular monthly visits to a physician beginning with or before the fifth month, with examination of urine and blood pressure at each visit. Only 33 (5 per cent) of the 627 women had had this grade of care, and as 10 of them died before reaching the last trimester, these 10 probably sought a physician because of troublesome symptoms. Two of the 33 apparently had had adequate care as described in Standards of Prenatal Care[1] for which visits beginning in the second month, a Wassermann test, and pelvic measurements are also required.

3. Deaths from criminal abortion are classified according to the International List of Causes of Death as due to homicide. The Bureau of the Census does not publish their number as it is manifestly incomplete, because some of these deaths are undoubtedly registered as due to other causes.

1. Standards of Prenatal Care; an outline for the use of physicians, U. S. Children's Bureau Publication No. 153. Washington, 1925.

Grade II (indifferent): Prenatal care consisting of at least (1) a general physical examination, including examination of heart, lungs, and abdomen; and (2) regular monthly visits to a physician beginning not later than the seventh month, with examination of urine and blood pressure at each visit. Thirty-three (5 per cent) of the 627 women had had this grade of care.

Grade III (poor): Prenatal care not meeting the requirements of Grade II. It may have consisted of only a single visit or may have been care of good quality beginning in the eighth or ninth month. Of the 627 women 181 (29 per cent) had had this grade of care. Therefore, of the 627 women who died and concerning whom prenatal care could be studied, 558 (89 per cent) had had very inadequate prenatal care or none at all. Evidently more education along these lines is needed.

Three women had had some prenatal care, but sufficient information to grade it could not be obtained.

Table 5 shows the grade of prenatal care and period of gestation of these women. Table 6 shows the grades for white and colored women in the urban and rural areas.

Only 53 women of the 250 women who had had some prenatal care had had a Wassermann test; 53 had had pelvic measurements (18 of these probably had had external measurements only) and 161 had had at least one blood-pressure examination.

TABLE 5

Grade of prenatal care for women dying from puerperal causes at less than seven months and at seven or more months' gestation in Virginia: 1927 and 1928.

Grade of Prenatal Care	Women Dying From Puerperal Causes			
	Total	Period of Gestation		
		Less Than Seven Months	Seven or More Months	Not Reported
Total	767	200	566	1
Grade I	33	10	23	.....
Grade II	33	6	27	.....
Grade III	181	18	163	.....
Ungraded	3	.....	3	.....
None	377	61	316	.....
Not reported	49	14	34	1
Inapplicable*	91	91	.....	.....

*Induced abortions and cases in which pregnancy terminated before the third month.

The type of prenatal care that can be given depends upon the promptness with which the pregnant woman presents herself to a physician. Of the 250 women who had some prenatal care, 101 first visited the physician in or before the fifth month, so they were seen early enough to be given Grade I care, if the other requirements had been met. Thirty-three of these received Grade I care, 12 received Grade II care, and 55 received Grade III care; the care received by one woman could not be graded. Sixty-eight women made the first visit in the sixth or seventh month; 21 of them received Grade II care and 47 received Grade III care.

The women who died in the cities had received more and better prenatal care than those who died in the rural areas; the same was true of the white women who died as compared with the colored women.

Operative Delivery

Some report concerning the method of delivery was obtained for all but 3 of the 767 women who died from puerperal causes in the two years. Of these 764 women, 280 (37 per cent) had had an operative delivery, that is, an operation for the removal of the fetus or for the immediate removal of the membranes. When the women concerning whom there was no report as to the method of delivery are excluded, it appears that 117 (43 per cent) of the 275 women who died in the urban areas and 163 (33 per cent) of the 489 who died in the rural areas, also 163 (38 per cent) of the 426 white women, and 117 (35 per cent) of the 338 colored women, had had operations for delivery.

Fifteen women had laparotomies for ectopic gestation, 12 in the first trimester, 2 in the first or second trimester, and 1 in the last trimester.

Ten women had had therapeutic abortion, 3 in the first and 7 in the second trimester.

All but 3 of the remaining 255 operations were performed in the last trimester; 2 Cesarean sections and 1 dilatation of the cervix were done shortly before the last trimester. These 252 women constituted 45 per cent of the 564 who died in the last trimester for whom a report on operations was obtained.

Podalic version was the principal obstetric operation in 92 cases. These included 39 in which version followed dilatation of the cervix (manually, by bag, or by some other mechanical means); 4 cases of version followed by manual removal of the placenta, and 9 cases in which version was accompanied by both dilatation of the cervix and manual removal. In 10 of these 92 cases version followed failed forceps, and in 5 cases version was used with forceps on the aftercoming head. In 2 cases, in addition to the 92, one twin was delivered by version, the other by forceps.

The use of forceps was the principal operation in 74 cases. In 27 of these cases the use of forceps was preceded by artificial dilatation of the cervix (manually, by bag, or by other means), in 2 cases it was followed by manual removal of the placenta, and in 1 case it was accompanied by both of these operations.

Fifty-one women, including 2 in the second trimester, were delivered by Cesarean section, 7 of them after attempts at some other form of operative delivery. The 49 who were delivered in the last trimester constituted 9 per cent of the 564 women who died after reaching the last trimester, and for whom there was a report on operations for delivery as compared with 11 per cent of the corresponding group in the 15 States studied as a whole.

In 6 cases craniotomy or embryotomy followed attempts at some other method of delivery. In 4 cases delivery was by breech extraction, in 1 case following manual dilatation of the cervix. In 1 case "gloved fingers were used as forceps" for a manual extraction of the child. In 9 cases artificial dilatation of the cervix, and in 1 case the conversion of a face presentation to a vertex presentation (by midwife), were followed by spontaneous delivery; in 11 cases spontaneous delivery was followed by

TABLE 6

Grade of prenatal care for white and colored women dying from puerperal causes in urban and rural areas of Virginia: 1927 and 1928

GRADE OF PRENATAL CARE AND COLOR	WOMEN DYING FROM PUERPERAL CAUSES					
	Total		Urban		Rural	
	Number	Per Cent Distribution	Number	Per Cent Distribution	Number	Per Cent Distribution
Total	767	.....	276	.....	491	.....
Grade reported	627	100	198	100	429	100
Grade I	33	5	18	9	15	3
Grade II	33	5	14	7	19	4
Grade III	181	29	72	36	109	25
Ungraded	3	*	1	1	2	*
None	377	60	93	47	284	66
Grade not reported	49	.....	31	.....	18	.....
Inapplicable†	91	.....	47	.....	44	.....
White	426	.....	138	.....	288	.....
Grade reported	343	100	95	100	248	100
Grade I	29	8	15	16	14	6
Grade II	26	8	12	13	14	6
Grade III	113	33	38	40	75	30
Ungraded	2	1	.....	.....	2	1
None	173	50	30	32	143	58
Grade not reported	22	.....	11	.....	11	.....
Inapplicable†	61	.....	32	.....	29	.....
Colored	341	.....	138	.....	203	.....
Grade reported	284	100	103	100	181	100
Grade I	4	1	3	3	1	1
Grade II	7	2	2	2	5	3
Grade III	68	24	34	33	34	19
Ungraded	1	*	1	1	.....	.....
None	204	72	63	61	141	78
Grade not reported	27	.....	20	.....	7	.....
Inapplicable†	30	.....	15	.....	15	.....

*Less than one percent.
†Induced abortions and cases in which pregnancy terminated before third month.

manual removal of the placenta; in 1 case spontaneous delivery was accompanied by bag dilatation of the cervix and manual removal of the placenta. In 2 cases the type of operation was not reported.

Artificial termination of the second stage of labor in the last trimester was involved in 225 of these operations for delivery. There was a report as to the prenatal care given to 216 of these 225 women. Twelve of them had had good care (Grade I); 19 had had indifferent care (Grade II); 68 had poor care (Grade III); one had had some care that could not be graded; and 116 had no prenatal care. A report on pelvic measurements was obtained for 97 of the 100 who had had some prenatal care. Sixty of these 97 had not been measured, 25 had had both internal and external measurements, and 12 had probably had external measurement only.

ATTENDANT AT CONFINEMENT

The attendant at confinement was studied only for the 566 women who had reached the last trimester of pregnancy. Of these 566 women, 446 had been attended by a physician (including a few interns and medical students), but the physician had been preceded in seventy-eight cases by a midwife and in six cases by some other nonmedical attendant, such as a member of the family. In eighty-three cases a midwife was the only attendant at the confinement, and in fifteen cases there was some other nonmedical attendant; twenty-two women were said to have been unattended at the time of delivery (or at the time of death if they died undelivered).

Midwives therefore had attended at confinement 161 (28 per cent) of the 566 women who died of puerperal causes after reaching the last trimester of pregnancy. This includes the seventy-eight for whom a physician was called in to complete the delivery. Physicians, interns, and medical students attended 362 (64 per cent); forty-three (8 per cent) were attended by some nonmedical person (in six cases followed by a physician) or were unattended. During the same two years, according to the bureau of vital sta-

tistics of the State Department of Health, physicians reported 78,063 (69 per cent), midwives 33,282 (30 per cent), and others 1,368 (1 per cent) of the 112,713 live births.

Physicians reported 67,683 (86 per cent) of the 78,731 white live births and midwives reported 10,567 (13 per cent). Physicians had attended 248 (78 per cent) of the 318 white women who died after reaching the last trimester of pregnancy and midwives had attended forty-nine (15 per cent). Ten (3 per cent) had had some other attendant (in three cases followed by a physician) and eleven (3 per cent) had been unattended.

Physicians reported 10,380 (31 per cent) of the colored live births and midwives reported 22,713 (68 per cent). Physicians had attended 114 (46 per cent) of the 248 colored women who died in the last trimester of pregnancy, and midwives had attended 112 (45 per cent); eleven (4 per cent) had had other attendants (in three cases followed by a physician), and eleven had been unattended at confinement.

Of the 248 white women who died after physician's attendance seventy-seven (31 per cent) died of puerperal septicemia, seventy-three (29 per cent) of puerperal albuminuria and convulsions, thirty-five (14 per cent) of puerperal hemorrhage, and the rest of other causes. Of the forty-nine white women who died after midwife attendance, twenty died of puerperal septicemia, twelve of puerperal hemorrhage, and ten of puerperal albuminuria and convulsions.

Of the 114 colored women who died after physicians' attendance, fifty-six (49 per cent) died of albuminuria and convulsions, twenty-seven (24 per cent) of puerperal sepsis, twelve (11 per cent) of puerperal hemorrhage, and the rest of other causes. Of the 112 colored women who died after midwife attendance, fifty-one (46 per cent) died of puerperal sepsis; thirty (27 per cent) of puerperal albuminuria and convulsions, and seventeen (15 per cent) of puerperal hemorrhage.

The large proportion of deaths from puerperal albuminuria and convulsions among the women who died after physicians' care, particularly among the colored women, suggests that the physicians had an unfavorable selection of cases. This is further brought out by the fact that thirty-one of the fifty-two colored women who died of puerperal albuminuria and convulsions after physicians' attendance and for whom there was a report were in coma or in convulsions when first seen by the physicians, and seven were otherwise in poor condition.

Technique of the Physician

In 374 of the 446 cases in which the woman was attended at confinement by a physician, intern or student (including those following midwives and other nonmedical attendants), the one who actually delivered her, or who was in charge if she died undelivered, described his technique. It was called aseptic in 144 (39 per cent) of the cases, attempted aseptic but under conditions that rendered strict asepsis unlikely in forty-seven (13 per cent), clean but not sterile in 131 (35 per cent), and not clean in fifty-two (14 per cent). However, in forty-eight cases in the first three groups the physician had been preceded by a midwife, and in fifty-five cases he was preceded by another physician whose technique was less careful than his own.

Of the 235 cases of white women attended by physicians, interns, or medical students concerning whom technique was reported, aseptic technique had been used in ninety-five (40 per cent) of the cases, attempted aseptic in thirty-three (14 per cent), clean but not sterile in eighty (34 per cent), and not clean in twenty-seven (11 per cent).

Of the 139 cases of colored women attended by physicians, interns, or students concerning whom technique was reported, aseptic technique was used in forty-nine (35 per cent) of the cases, attempted aseptic in fourteen (10 per cent), clean but not sterile in fifty-one (37 per cent), and not clean in twenty-five (18 per cent).

The physician made vaginal examinations in 287 cases and made no vaginal examinations in 122 cases; in thirty-seven cases there was no report on this matter; and in 120 cases no physician was in attendance. The principal physician had made one vaginal examination in 121 cases, two examinations in forty-nine cases, and three or more examinations in seventy-nine cases; in thirty-eight cases the number of examinations was not given. Rubber gloves were reported used in 182 cases and not used in eighty-three cases; there was no report as to their use in twenty-two of the 287 cases having vaginal examinations.

In cases of seven or more months' gestation, pituitrin was said to have been used before the delivery of the child in seventy-five cases, after the delivery of the child in ninety-five cases, and at an unreported stage in five cases. In 344 cases pituitrin was said not to have been used; in forty-seven cases there was no report as to its use. Pituitrin was used before an artificial termination of labor in the last trimester in forty-two cases and was used in the second stage for two women who died undelivered.

Hospitalization

Of the 767 women who died of puerperal causes in the two years 363 had been hospitalized and 344 (209 white, 135 colored) died in the hospital. The deaths of 127 (seventy-four white, fifty-three colored) of the 344 women—also of five of the nineteen who left the hospital before death—occurred before the last trimester of pregnancy was reached.

Table 7 shows hospitalization at delivery and place of death among white and colored women dying from puerperal causes after reaching the last trimester and place of death for those who had not reached this period of pregnancy.

Seventy-six of the 132 women who died before reaching the last trimester and who were hospitalized entered the hospital after abortion, at least thirty-four of them a week or more after the abortion. Of the 566 women who died after reaching the last trimester 217 died in hospitals, and fourteen more had been hospitalized but died elsewhere. Of these 231 women 170 (including a few who died undelivered), entered the hospital before delivery. Only forty of these 170 had planned hospitalization; for 126 the hospitalization was emergency; in four cases there was no report on this matter. Sixty-one women entered the hospital after delivery, thirty-nine of them a week or more after delivery.

Medical Attendance and Accessibility

A report on the matter of medical attendance was obtained for all but three of the 767 women who died of puerperal causes in the two years Of these 764 women twenty-eight (4 per cent) had had no medical attention—so far as was known—in their pregnancy, at confinement, or in the puerperium; sixty-four (8 per cent) were not seen by a physician until they were dying. A report on accessibility was obtained for twenty-two of the twenty-eight who died without medical attention. Nine of the twenty-two lived in the same city or town as a physician. Eight had lived outside the town but less than ten miles from the physician, though in five of the eight cases the roads were very bad. Five were ten or more miles from the physician, two of them having the additional handicap of very bad roads.

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TABLE 7

Number of women dying in hospitals and residence of decedent, and number not dying in hospitals among women dying from puerperal causes in places of specified population in Virginia: 1927 and 1928

POPULATION* OF PLACE OF DEATH	WOMEN DYING FROM PUERPERAL CAUSES							
	Total	Hospital Cases					Death Not in Hospital	Not Hospital Cases
		Total	Death in Hospital					
			Total	Resident	Non-Resident	Residence Not Reported		
Virginia	767	363	344	177	164	3	19	404
100,000 or more	139	111	108	83	25	.....	3	28
Richmond	76	64	61	46	15	.....	3	12
Norfolk	63	47	47	37	10	.....	.....	16
10,000 to 100,000	137	113	111	58	52	1	2	24
2,500 to 10,000	72	55	53	13	40	.....	2	17
Less than 2,500	419	84	72	23	47	2	12	335

*Estimate as of July 1, 1926, made by U. S. Bureau of the Census.

TABLE 8

Hospitalization at delivery at seven or more months' gestation and place of death for hospital and non-hospital cases among white and colored women dying from puerperal causes at less than seven months and at seven or more months' gestation in Virginia: 1927 and 1928

HOSPITALIZATION AT DELIVERY AND PERIOD OF GESTATION	WOMEN DYING FROM PUERPERAL CAUSES						
	Total	White			Colored		
		Total	Death in Hospital	Death Not in Hospital	Total	Death in Hospital	Death Not in Hospital
Total	767	426	209	217	341	135	206
Period of gestation seven or more months	566	318	135	183	248	82	166
In hospital†	168	102	95	7	66	62	4
Emergency	126	68	65	3	58	56	2
Planned	40	33	29	4	7	5	2
Not reported	2	1	1	.....	1	1	.....
Not in hospital	398	216	40	176	182	20	162
Period of gestation less than seven months	200	108	74	34	92	53	39
Period of gestation not reported	1	.....	.....	.....	1	.....	1

†Includes cases in which there was no issue.

There were in all 158 women who lived ten miles or more and forty-four who had lived twenty-five miles or more from a physician. For 117 of these 158 women there was no other evidence of inaccessibility; three of them died without medical attendance, seven had a physician only when they were dying, and 107 had some care from a physician before they were actually dying. Forty-one of the 158 women who had lived ten or more miles from a physician were on very bad roads or horseback trails; two of them died without medical attention; four had medical attention only when they were dying, and thirty-five had earlier medical attention.

As would be expected, hospitalization was more frequent among the women who died in urban than in rural areas. (Table 8.) Of the 139 women who died in Richmond and Norfolk, 111 (80 per cent) had been hospitalized and 108 (78 per cent) died in hospitals; twenty-five of them were nonresidents. Of the 137 women who died in other cities of 10,000 or more

inhabitants 113 (82 per cent) had been hospitalized; 111, including fifty-two nonresidents, died in hospitals. Of the seventy-two women who died in cities of 2,500 but less than 10,000 inhabitants, fifty-five (76 per cent) had been hospitalized and fifty-three (including forty nonresidents), died in hospitals. Of the 419 women who died in places of less than 2,500 inhabitants, eighty-four (20 per cent) had been hospitalized and seventy-two died in hospitals; forty-seven of the seventy-two were known to be nonresidents. Of the 219 women who died in hospitals in the urban areas 133 had reached the last trimester of pregnancy, ninety-eight of whom (74 per cent) entered the hospital before delivery, seventy-four of these ninety-eight as emergency cases. Of the 125 women who died in hospitals in the rural areas eighty-four had reached the last trimester, fifty-nine of whom (70 per cent) entered the hospital before delivery, forty-seven of them as emergency cases.

Sixty-four women who were delivered in hospitals died of sepsis. In thirty-five of these cases the sepsis was said to have been developed in the hospital.

Nineteen women died in hospitals not registered by the American Medical Association.

Illegitimacy

The deaths of ninety-six unmarried mothers were assigned to puerperal causes in the two years. Seventeen of these women were white, seventy-nine were colored. Forty-nine women (seven white, forty-two colored), died in the urban areas; forty-seven (ten white, thirty-seven colored), in the rural areas. Eighteen of these ninety-six women died following abortions.

Summary

The 783 deaths assigned to puerperal causes in Virginia in 1927 and 1928 were studied by personal interviews with the attending physicians or midwives. Sixteen were found to be not actually puerperal according to the International List of Causes of Death and hence were omitted from the detailed study, but it is probable that at least that many deaths that were actually puerperal were omitted from consideration on account of having been registered as due to other causes.

Of the 767 deaths studied in detail, 40 per cent were due to puerperal septicemia, 28 per cent to puerperal albuminuria and convulsions, 11 per cent to puerperal hemorrhage, 9 per cent to other accidents of labor, 9 per cent to accidents of pregnancy, and 3 per cent to puerperal phlegmasia alba dolens, embolus, sudden deaths.

Twenty-six per cent of the deaths occurred before the last trimester of pregnancy was reached. Puerperal septicemia caused 59 per cent of the deaths in this period and 33 per cent of the deaths after last trimester was reached. Puerperal albuminuria and convulsions caused 16 per cent of the deaths of the earlier period and 33 per cent of the deaths of the later period.

Abortion (that is, the termination of a previable uterine pregnancy) preceded 19 per cent of the puerperal deaths and 36 per cent of the deaths from puerperal septicemia. At least 8 per cent of the puerperal deaths and 18 per cent of the deaths from puerperal septicemia followed induced abortions other than therapeutic.

Forty-four per cent of the women had given birth to living children, 23 per cent to stillborn children, and 23 per cent to previable children; 11 per cent died undelivered.

Prenatal care was studied in the 627 cases that remained after exclusion of the cases of induced abortion, cases of pregnancies of only 2 months' duration or less, and cases in which no information as to prenatal care could be obtained. Of those 627 women, 60 per cent had had no prenatal care, 29 per cent had had very inadequate care, 5 per cent had had indifferent care, and 5 per cent had had good care.

Forty-five per cent of the women who died after reaching the last trimester of pregnancy had had operative deliveries.

Fifteen per cent of the women who died after reaching the last trimester had been attended at confinement by a midwife only, 14 per cent had been attended by a midwife followed by a physician, and 7 per cent were unattended or had as attendant only some nonmedical attendant other than a midwife. The remainder were attended by physicians.

Forty-seven per cent of the women who died of puerperal causes in the State had been hospitalized. Eighty per cent of the women who died in cities of 100,000 or more inhabitants (Richmond and Norfolk), 82 per cent of the women who died in the other cities of 10,000 or more inhabitants, 76 per cent of those who died in cities of 2,500 but less than 10,000 inhabitants, and 20 per cent of the women who died in the rural areas had been hospitalized.

Woman's Auxiliary, to the Medical Society of Va.

President—Mrs. William Lett Harris, 1112 Matoaka St., Norfolk.
President-Elect—Mrs. Joseph Bear, 3012 Monument Ave, Richmond.
Recording Secretary—Mrs. Fletcher J. Wright, 49 S. Market St., Petersburg.
Corresponding Secretary—Mrs. Charles A. Saunders, 1000 Gates Ave., Norfolk.
Treasurer—Mrs. Reuben F. Simms, 2034 Park Ave., Richmond.

News From Local Auxiliaries.

Elizabeth City County Auxiliary

The Woman's Auxiliary to the Elizabeth City County Medical Society held its second meeting on Saturday, May 27th, at the home of the president, Mrs. J. J. Cullinan, Hampton, the first meeting having been a joint organization meeting with the Warwick County Auxiliary in April.

The attendance was small due to the fact that there are few women eligible, but those present manifested keen interest in the auxiliary. Mrs. W. L. Harris, President of the State Organization, and Mrs. M. N. King, one of the vice-presidents, both of Norfolk, were present. They discussed the function and work of the new auxiliary and suggested various projects to be undertaken later.

Communications were read from Mrs. Joseph Bear, President-elect of Richmond, and from

Mrs. W. T. Sanger, Chairman of Press and Publicity, also of Richmond.

The main business of the day was the discussion on the advisability of remaining a very small separate unit or joining another group. It was decided that the Elizabeth City County group should become members-at-large of the State organization and affiliate with the Warwick County Auxiliary. It will thus be possible for the small group here to carry on its own project acting as a committee of the Warwick County Auxiliary and at the same time not losing its individuality as a group. The mutual benefit of this plan is evident.

An informal luncheon was served at the conclusion of the meeting, after which the group attended the benefit bridge party of the Warwick County Auxiliary in Newport News.

RUTH MCLEAN WRIGHT,
(MRS. ROBERT H. WRIGHT),
Secretary.

RICHMOND ACADEMY OF MEDICINE AUXILIARY

From the Richmond Auxiliary comes a resumé of the year's work as follows:

We have cooperated in promoting the early diagnosis tuberculosis campaign, furnishing for this a motor corps to bring patients to the clinics, and clerical assistance in taking the history on cases. We cooperated with the local Woman's Club in an attractive, well-attended, Child Welfare Conference, which lasted several days. Many of our doctors and several auxiliary members were on the program. Before the new home of the Richmond Academy of Medicine was opened in the Fall we raised funds to furnish the room in which the famous Miller collection of old medical books, prints, silhouettes, and curios are housed. Soon after this room was furnished we served as hostesses to several hundred wives of different doctors during the meeting of the State society in Richmond.

Money was contributed for a milk fund for twenty undernourished children in the public schools of Richmond.

We served luncheon to nearly a hundred five-point school children who were given a trip to Richmond—one from each county—as a reward for their superior physical fitness.

At a card party at the Country Club in May, we raised more than a hundred dollars which will be used for the various activities of the Auxiliary.

A donation of fifteen dollars was made in the campaign for the Negro recreational center of Richmond.

With Mrs. Stuart McGuire as general chairman, we are concentrating our efforts now upon plans for the entertaining of the Southern Medical Association which will meet in Richmond in the Fall. We very much need the interest and assistance of every doctor's wife in Virginia for this unusual demand upon us as hostesses.

Truth About Medicine

In addition to the articles previously enumerated, the following have been accepted:

Lederle Laboratories, Inc.
- Ampules Glucose (U. S. P. Dextrose) Solution—Lederle, 20 c.c.
- Ampules Glucose (U. S. P. Dextrose) Solution—Lederle, 50 c.c.
- Ampules Glucose (U. S. P. Dextrose) Solution—Lederle, 100 c.c.

Parke, Davis & Co.
- Antipneumococcic Serum (Felton) Type I.
- Erysipelas Streptococcus Antitoxin Refined and Concentrated—P. D. & Co., 20 c.c. syringe package.
- Sal-Ethyl Carbonate.
  - Tablets Sal-Ethyl Carbonate, 1 gr.
  - Tablets Sal-Ethyl Carbonate, 5 grs.
  - Tablets Sal-Ethyl Carbonate with Amidopyrine.

New and Nonofficial Remedies

The following are some of the products which have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in New and Nonofficial Remedies:

Chlorbutanol (Hydrous)—Merck.—A brand of chlorbutanol—N. N. R. (New and Nonofficial Remedies, 1933, p. 137) containing one molecule of water in two of chlorbutanol. It is used in the preparation of aqueous solutions. Merck & Co., Inc., Rahway, N. J.

Chlorbutanol (Anhydrous)—Merck.—A brand of chlorbutanol—N. N. R. (New and Nonofficial Remedies, 1933, p. 137) for use in the preparation of oil solutions. Merck & Co., Inc., Rahway, N. J.

Neocinchophen—Merck.—A brand of neocinchophen—N. N. R. (New and Nonofficial Remedies, 1933, p. 141). Merck & Co., Inc., Rahway, N. J. (Jour. A. M. A., May 27, 1933, p. 1685.)

Propaganda for Reform

Bacteriophage Therapy.—The early hopes of bacteriophage therapy have hardly been realized. In spite of much experimentation, which has shown why bacteriophage could not function therapeutically, at least as a specific agent pitted against a specific infection, clinical observations have been accumulating which indicate that intravenous injection of bacteriophage may have beneficial effects. The material labeled "bacteriophage" which the clinician injects into a patient with severe septicemia is obtained by first growing the particular bacterium on a broth medium and then introducing bacteriophage into the turbid culture. After further incubation the material becomes entirely clear, showing that the bacteria have been dissolved and killed by the bac-

teriophage, the concentration of which has increased sufficiently to cause bacterial disintegration. Obviously, such a bacteriophage solution is not a simple solution or suspension of bacteriophage. These disintegrated cultures of bacteria may therefore be considered supervaccines containing all the chemical constituents of the bacterial. Larkum has advocated, in general, the use of lysed bacterial cultures instead of the ordinary vaccine as being much more effective. Though the use of bacteriophage as a specific agent has been disappointing, it may yet yield important results by showing how more effective vaccines may be prepared. (Jour. A. M. A., May 6, 1933, p. 1431.)

Vitamin D and Well-being.—New problems in relation to the possible function of vitamin D in promoting bodily welfare continue to arise, despite the commendable progress of recent years. One concerns the uncertainty of the need of supplementing the diet with added vitamin D if it is liberally supplied with the appropriate mineral constituents, notably calcium and phosphorus. In new studies on animals that were subjected over long periods to extreme calcium deprivation, Templin and Steenbock, of the University of Wisconsin, found that the introduction of moderate amounts of vitamin D into the calcium-deficient ration provided considerable protection from mineral losses in a parallel series of rats. The results tend to support the impression of the value of vitamin D as a food constituent for the adult. The Wisconsin biochemists frankly insist that it is unwarranted to expect that vitamin D administered in any amount should be able to compensate fully for an extreme lack of calcium or other dietary essentials. As the basal diet was not optimal with respect to protein or phosphorus content, it is possible that the favorable effects of vitamin D on calcium conservation might have been accentuated if the diet had been improved in these respects also. This is equivalent to the much needed reminder that vitamins are by no means the sole essentials for a healthful diet. (Jour. A. M. A., May 27, 1933, p. 1692.)

Book Announcements

The Clinical Aspect of Chronic Poisoning by Aluminium and Its Alloys. By LEO SPIRA, M. D. With a Foreword by PROF. DR. HANS HORST MEYER. London. John Bale, Sons & Daniellson, Ltd. 1933. Pamphlet of 28 pages. Price, 2 shillings sixpence.

After somewhat of an interlude in a dispute which has taken on a rather acrimonious character the author of this twenty-eight paged pamphlet cites the symptom complex observed on a group of patients including himself, while in the throes of poisoning, presumably resulting from the ingestion of food cooked or stored in aluminum utensils. Chlorinated and aluminized tap water are also exposed as potential sources for "irritants" capable of also causing the same triad of symptomatology listed below.

The author divides this malady into three groups: Gastro-intestinal cutaneous, and general. In the first group is listed as a cardinal sign constipation, accompanied by flatulence and colicky pains "of such severity as in some cases to suggest the possibility of gastric or duodenal ulcer, cholelithiasis, nephrolithiasis, colitis, or even "acute abdomen," and resistance of the abdominal walls associated with tympanites appears to be extremely common." The victims of the necessarily ubiquitous disease further complain of dryness in the mouth and throat, anorexia, nausea and vomiting, involvement of the tongue, stomatitis, and a gingivitis not unlike alveolar pyorrhea. The cutaneous manifestations run the gauntlet of dermatological terminology and are accounted for by the author as being secondary to the gastro-intestinal involvements. The general group in this "symptom complex" includes neuralgia, twitching of the leg (these two phenomena appearing at night and frequently with such gusto as to alarm the patient), paraesthesias, arthralgia, vertigo, excessive perspiration, albuminuria, hypotension, mental depression, and general malaise.

Seven clinical cases, including his own, are reported in which one or more of the above symptoms were present, and in which complete cure was obtained by eliminating the sources of intoxication and mentioned above, and by the administration of charcoal and aperients.

The last half or more of this monograph is devoted to the various agents in aluminum utensils which might be etiological factors in chronic aluminum poisoning. In this discussion the work of several investigators is cited, both pro and con. Besides aluminum itself, fluorine, silica, ferro-silicon, arsenic, antimony, and petroleum derivatives, as contaminants of commercial aluminum, are mentioned as potent partners in the production of this twentieth century octopus, aluminum sickness.

As an afterthought, Dr. Spira closes with a paragraph of opinions in which he expands the symptomatology of aluminum poisoning sufficiently enough to include diverticulosis of the colon, and carcinoma of the gastro-intestinal tract.

The paper is opened by a foreword by Professor Hans H. Meyer, of Vienna, and contains about eighty-six references in its bibliography.

Modern texts upon pharmacology belittle the possibility of aluminum poisoning as a result of eating food cooked in utensils made of this material. However, such work as this might

well stimulate further observation along these lines to the end that this tremendously important problem be settled once and for all.

H. B. HAAG, M. D.

Diet in Sinus Infections and Colds. By EGON V. ULLMANN, M. D., formerly Special Lecturer for Biology at the Oregon State College; Instructor at the First Medical Clinic at the University of Vienna, etc. Recipes and Menus by Elza Mez. New York. The Macmillan Company. 1933. 12mo of 166 pages. Cloth. Price, $2.00.

Sinus disease, actual or imagined, is one of the most popular of illnesses. Add to this fact the recent fad for dieting and the conditions are met for a large public appeal in a book bearing the above title.

The book attempts to give the layman first, a knowledge of the anatomy, physiology and pathology of the nose. A discussion in general of dietary principles follows. Then in great detail the dietetic treatment of colds and sinus disease, according to the author's ideas, is considered.

An appendix containing recipes from "soup to nuts" is supplied, so that the reader may put into practical application the theories of the author.

The thesis is that sinusitis and colds can be prevented and cured (though the necessity of surgical treatment in some cases is not denied) by a dietary regime.

A quotation will summarize the purposes: "The diet is directed to counteract acidosis, to increase the effect of calcium in the system, and to prevent eventual lack of vitamins."

The layman will have considerable difficulty in understanding the text, as the discussion is technical. Moreover, the diet seems to be as complicated in its management as that for diabetes.

A book that categorically states that "the paranasal sinuses form the resonance box for the voice" could lead one to wonder whether other statements were also unsupported by facts. Another assertion that causes doubt is "blackberries produce perspiration and dissolve mucus."

Perhaps diet has a part in the prevention and cure of colds and sinus disease, but this book falls far short of advancing the status of this theory.

EMANUEL U. WALLERSTEIN, M. D.

Senile Cataract: Methods of Operating. By W. A. FISHER, M. D., F. A. C. S., Chicago, Ill. With the collaboration of Prof. E. Fuchs. Prof. I. Barraquer, Dr. H. T. Holland, Dr. John Westley Wright, Dr. A. Van Lint, and Dr. O. B. Nugent. 267 pages, 183 illustrations, 112 of which are colored. Published by Chicago Eye, Ear, Nose and Throat College, Chicago, Ill. 1933. Cloth. Price, $1.00.

This little volume, now in its second edition, covers the subject completely. Various chapters are by the most outstanding men in the world.

The illustrations are profuse and give an adequate idea of the steps in any operation. The method of choice by all the authors of this book is intracapsular operation.

In spite of the experiences in India, we, in this country, could wish that a little more emphasis were placed upon elimination of foci of infection in preparing patient for operation.

Chapter VII, "A Method of Acquiring Technic," is of great importance. The entire work is well worth the study and consideration of anyone who is interested in this type of work.

CLIFTON M. MILLER, M. D.

A Study of Masturbation and the Psychosexual Life. By JOHN F. W. MEAGHER, M. D., F. A. C. P., Neurologist to St. Mary's Hospital, Brooklyn; Neurologist to the Mary Immaculate Hospital, Jamaica, etc. Second Edition. New York. William Wood and Company. Octavo of 130 pages. Cloth.

Masturbation is a habit which gives parents and others who have the care and training of children great concern. Unwise treatment may give rise to lasting damage to the personality of the patient. For this reason many will welcome the circulation of this book, now in its second edition.

The author states in the introduction the purpose of the book:

"A scientific realization of the significance of masturbation in youth by the general medical practitioner should soon be followed by a similar appreciation by parents, clergymen and teachers, of its place in development. Only by a wide diffusion of this special knowledge will we be able to successfully limit those problems which arise as a result of sex conflicts and maladjustments. And then when the intelligent public are better informed, they will assist in preventing a great deal of the unnecessary neurotic manifestations, which today are all too common, not only in youth, but in many adults as well.

"We see many evidences of the present-day interest in this and allied subjects on the part of progressive medical men, and this is in great contrast to the neglect with which the whole psychosexual life was treated only a generation ago."

As the title indicates, the book is more than a study of masturbation. It is likewise a contribution to the viewpoint held by most men of scientific training as contrasted with the old ideas about sex, which are, unfortunately, still too widely held.

In the first half of the book, the author gives a simple and concise resumé of the psychosexual life of the individual. In the second half there follows a discussion of masturbation, its causes, prevalence of the habit, symptoms and sequelae, and finally a chapter on treatment. While in the main the discussion is scientific and well-founded, there are times when the author is inclined to be moralistic, as, for example, when he stresses good traits, good trends, good wishes, and good incentives. The chapter on treatment is disappointingly weak, especially in its psychotherapeutic suggestions.

The conclusions, as follows, indicate the main theses of the book and present one or more points of controversy:

"1. Infantile masturbation is practically universal; in adolescents it is the rule with boys, and is very common in girls; in adult-hood it is more common in women than in men.

"2. Physiologically, masturbation is not abnormal in young children, but the habit is always abnormal in adults, in whom it shows a psychosexual maldevelopment, or a regressive phenomenon.

"3. The harm resulting from excessive indulgence in the habit is chiefly in the mental and moral spheres, rather than in the physical sphere.

"4. In the adolescent and in the adult, a cure of the habit is easiest where the traits and trends of the individual are predominantly good, where the wish to give up the habit is strong, and where numerous good incentives are actively present.

"5. Sympathy and encouragement are great aids to the patient, whereas an antagonistic attitude, censure, and punishment are usually harmful.

"6. The problem is more often a psychopathological one, than a medical or surgical one."

Some would question the author's statement, "the habit is always abnormal in adults, etc.," especially in the light of the researches of Drs. Robie, Robinson, Davis, and others.

Although many authorities are cited, no direct quotation is used. This, and the fact that some of the statements attributed to authorities like Healy, for instance, were probably from their earlier works, makes one wish that the most important citations, at least, had been more specific. Dr. Healy, when the writer worked in his clinic in 1927, emphasized the value in treatment of relieving the patient of all feelings of guilt. This non-moralistic attitude of Healy's is not mentioned in this book, nor is the relief of guilt-tension evaluated in the chapter on treatment. Also, Dr. Healy frequently stated that masturbation, *per se*, in his opinion, was never the cause of mental deficiency or any form of nervous and mental disease. In several places the author implies that a contrary opinion is held.

The fact that the book is dedicated to one of the greatest psychonanalysts of today and is written with a psychoanalytic slant should not be allowed to influence the reader against it, because, after all, no other system of therapy gives such convincing explanations of heretofore unexplained mechanisms.

The book should be of especial interest to general practitioners, pediatricians, ministers, educators and social workers.

HARVIE DEJ. COGHILL, M. D.

Diseases of Tradesmen, by Bernardino Ramazzini (1633-1714), etc., compiled by HERMAN GOODMAN, B. S., M. D., New York City, with which is bound Silk Handlers' Disease of the Skin, etc., by HERMAN GOODMAN, B. S., M. D., Medical Lay Press, New York City, 1933.

This little volume should awaken interest in Bernardino Ramazzini, a famous Italian physician, whose career as practitioner and teacher was successfully begun in Medina and gloriously ended in Padua where as successor to Sanctorius he occupied the highest positions in that ancient seat of learning. Ramazzini was the founder of modern sanitary science. The earliest formal treatise on this subject was his *De Morbus Artificum* which first appeared in 1700. Here are described under fifty-eight chapter heads the various occupational diseases —the sciatica and vertigo of potters, the eye disturbances of gilders and printers, the pulmonary diseases of miners and stone masons, as well as the diseases peculiar to midwives, nurses, bakers, fishermen, grooms, wrestlers and learned men. Dr. Goodman, besides presenting us with brief abstracts of each of these chapters includes in his publication an interesting engraving of Ramazzini and an entertaining account of his life. He has appended an original account of *Silk Handlers' Disease of the Skin* which for obvious reasons might more appropriately have been published separately.

W. B. BLANTON, M. D.

The National Society for the Prevention of Blindness. The Challenge of Ophthalmologic Problems—Do We Meet Them?; History and Development of Sight-Saving Classes in the United States; and Social Service with Eye Patients. Pamphlets published by the National Society for the Prevention of Blindness, 450 Seventh Ave., New York City. These range in prices from 5c to 15c.

The Wellcome Research Institution and the Affiliated Research Laboratories and Museums Founded by Sir Henry Wellcome, LL.D., F. R. S. London, England. Exhibits at the Chicago Exposition. 1933. 12mo of 62 pages. Illustrated. Cloth.

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VOLUME 60 JULY, 1933 No. 4

Editorial

Maternal Mortality in Virginia in 1927 and 1928.

Anything that throws light upon the important subject of maternal mortality should be of great interest to the medical profession. When that information comes from a careful study of the conditions surrounding the maternal deaths in the State of Virginia it should be studied by every physician in the State and the lessons learned put into practice to the end that our women may deliver with less danger.

The paper appearing in this issue under the title "Maternal Morbidity in Virginia in 1927-1928" should be read by every doctor in the State and then laid aside for further study and ready reference because it is quite impossible to digest the many important facts in one reading.

This statistical study was made at the request of the Medical Society of Virginia by Dr. J. Shelton Horsley, then its president, and of the State Board of Health by the late Dr. Ennion G. Williams.

No attempt will be made to thoroughly analyze this paper but rather to comment upon some of the outstanding features and to try to arouse sufficient interest in the subject so that the article will be read.

PLAN OF STUDY

It was found that 783 deaths during 1927 and 1928 could be attributed to the puerperal state, according to the International List of Causes of Death.

Copies of the birth and death certificates of the 783 cases were obtained from the Bureau of Vital Statistics.

The physicians and the midwives who attended the cases were interviewed personally by physicians on the staff of the Children's Bureau of the United States and, where the patient died in the hospital, the charts were carefully examined after consent of the physician in charge of the case.

Many of us remember how courteously and carefully the cases were investigated and feel sure that the report is as accurate as it is humanly possible to make it.

The study revealed that sixteen of the cases had been wrongly classified and were deleted from the report except in tables Nos. 1 and 2. Seventy-eight cases were reclassified within the puerperal group itself.

URBAN AND RURAL

A very interesting grouping of the statistics is to be found in Tables Nos. 1 and 1A.

Here the statistics are broken up into the comparison between total urban and rural deaths, comparing Virginia with the total birth registration area of the United States, in which our urban statistics are distinctly unfavorable.

In our urban group are included the ten cities that had ten thousand or more inhabitants in 1920: Alexandria, Charlottesville, Danville, Lynchburg, Newport News, Norfolk, Petersburg, Portsmouth, Richmond, Roanoke. The rest of the state was regarded as rural.

It is interesting to note that the death rate

from all puerperal causes was less in the rural than in the urban sections with the exception of deaths from puerperal hemorrhage, and that was the same.

It must be remembered, however, that cases with hemorrhage cannot be easily transported.

White and Colored Deaths Compared With Registration Area

Table No. 1A reports the comparison between colored and white deaths in Virginia and the birth registration area of the United States. The Virginia report is definitely lower, particularly in colored deaths.

Cause of Death

Forty-three per cent of our deaths were as the result of infection including phlegmasia alba dolens, but these statistics include abortions, while 28 per cent were as the result of toxemias with convulsions; hemorrhage accounted for 11 per cent.

Prenatal Care

Appreciating that prenatal care is one of the most certain ways of reducing maternal mortality and infant mortality, the study of the care that the women had during their pregnancy was very intensive.

The ninety-one cases of induced abortion were excluded from the group and in forty-nine cases no report on prenatal care could be obtained. The group in which prenatal care was studied was therefore 627.

Sixty per cent had no prenatal care.

Five per cent had what was called good prenatal care.

Five per cent had what was designated as indifferent prenatal care.

Twenty-nine per cent had poor prenatal care.

The doctor cannot give good prenatal care unless the woman comes to him. He cannot give her any sort of attention unless she puts herself under his care.

How to get the pregnant woman to the doctor in time for him to be of real service to her is indeed a problem that has engaged the attention of your Maternal Welfare Committee for six years.

The most important single factor is education, particularly of the public, to the fact that pregnancy and labor are safe, as a rule, when made so by the doctor. The next in importance is cooperation between the nurses, visiting and county, and the doctors to the end that every pregnant woman shall see a doctor at least once during her pregnancy.

When the patient and doctor have gotten together in prenatal care, the 28 per cent of deaths from toxemia will be practically wiped out, and, when adequate prenatal care is given, the sepsis rate will be lowered by the elimination of gonorrhea, the planning for the best method of delivery instead of the emergency at the end.

The most important single lesson to be learned from this elaborate report is the fact that 60 per cent of the women who died had no prenatal care. In these cases there was no way by which the doctor could prepare the patient against suffering and death.

Operative Deliveries

It is interesting to note that 37 per cent of the women that died had operative deliveries. Podalic version was the principal operation in ninety-two cases and forceps was the principal operation in seventy-four. Cesarean section was done in fifty-one.

Let us teachers, obstetricians, general practitioners, medical students, nurses, and Boards of Health all cooperate to make Virginia safer for the pregnant women by at least trying to improve the character of the prenatal work and by making ourselves easily and willingly available to those of the indigent that need our services.

Greer Baughman, M. D.

Cardiospasm.

Sturtevant* has done a useful piece of work in bringing to publication a general consideration of cardiospasm. He has defined the condition as one without the exhibition of pain but as one in which food does not pass readily from the esophagus into the stomach. Ultimately, by retention of food, the esophagus undergoes dilatation. Sturtevant recounts the history of this condition in medical publications. He employs the survey of a broad group of writers. He cites some 133 authors in his paper. This is a valuable catalogue of titles touching this subject and may be useful to those desiring to read beyond the author's article.

It would seem that the esophagus needs a wider and a more thorough study by the practitioner. It is an organ heretofore little considered by practitioners. It is one frequently abused and frequently diseased. Spastic conditions of the esophagus have been recognized since 1733. Various important discus-

*Sturtevant—Archives of Internal Medicine, Vol. 51, No. 5, page 714.

sions have been published through the two centuries. A notable collection of cases of esophagus ectasia have been made at and reported upon by the Mayo Clinic, covering the period from 1908 to 1923 during which time 415 patients had been treated.

On the subject of pathogenesis, Sturtevant records various conceptions of a number of authors. There appears to be little unanimity among them. In predisposing factors, one may place psychasthenia, or the psychoneurotic type of patient. Others oppose this idea and affirm that patients with cardiospasm are not usually neurotic in type. Trauma is brought forward as a factor. Fear and psychic "trauma" is stated to be a cause. Sudden anger and fright have seemed to precipitate an attack of cardiospasm. In matters of sex, males predominate. The 2nd, 3rd, and 4th decades seem to be the age of highest incidence. Pathologic changes bring about dilatation. This may be absent or slight in incipiency. The esophagus may become spindle-shaped or club-shaped, and sometimes sausage-shaped. It may be thickened, hypertrophied or inflamed. There may be a warty chronic growth of the mucosa. Round cell infiltration of the submucoca, fatty degeneration inflammation of the muscularis, with pigmentation, may occur in this condition as it becomes chronic. There is more or less chronic esophagitis, says Sturtevant.

While symptoms may begin suddenly, it is more usual for them to appear with a periodicity, gradually increasing in intensity. Citing the division of the cases by Plummer, one notes a first stage in which the cardia intermittently offers resistance to the passage of food: but the food passes. From this condition the patient experiences discomfort, pain, and possibly a choking sensation while taking food. Such patients may say, "My food seems to stick here," but there is no regurgitation of the food at this period. In the second stage, however, the spasm becoming stronger, the food is retained and is later regurgitated from a dilated esophageal zone above the constriction. Continuation of this state, over a period, leads to the symptoms of a third stage which are characterized by discomfort, regurgitation at intervals, occurring at times long after eating. The discomfort is in the chest. Anxiety, cyanosis and cold perspiration, anginal-like pains, mark the course of this stage of the disease. There may be difficulty experienced by the patient in attempting to belch. Food regurgitates but is not sour. Other symptoms are noted by the author, but from the foregoing, diagnostic indications may be established. However, diagnosis by the esophagoscopy in skillful hands offers more conclusive means. Roentgen ray examination of such cases brings a more accurate means of diagnosis to hand.

The wide range of disorders found in practice more or less connected with the stomach makes the rare condition of cardiospasm of interest. This review of the subject by Sturtevant summarizes important data for the reader.

Primary Duodenal Obstruction with Toxemia.

In reporting a case, Bargen and Walten* draw attention to an important clinical condition. This case patient was a young woman of fourteen years, who had been vomiting intermittently for three months. She had passed watery, foamy stools which were accompanied by colic. For three years she had suffered acute pain in the lower quadrant of the abdomen. Dietl's crisis had been the diagnosis. Loss of weight had been very great. Tachycardia and edema of the ankles had appeared. Appearance of the patient was one of dehydration and pallor. Trousseau's sign was positive and tetany had been noted. The abdominal wall was thin and flaccid. No parasites, ova, or unusual bacteria, or large amount of fat were found in the stools. The recurring severe attacks of pain in the upper abdomen accompanied by gastric retention, recurrent watery, foamy stools, obscure fever, and periods of complete obstruction in the upper part of the intestine were significant symptoms. The findings by X-ray were interesting. The stomach showed no change and the first portion of the duodenum appeared normal. In the second portion and jejunum there were striking ulcerations. Motility was depressed. Duodenal and jejunal segments required vigorous manipulation. Obstruction thereabouts was suspected. Operation disclosed the entire duodenum, instead of being retroperitoneal, was intraperitoneal. The duodenojejunal angle was to the outer side of the ascending colon, the omentum and ascending mesocolon were adherent to the jejunum and duodenum. Dilatation and obstruction were found.

Duodenojejunostomy was performed. The

*Proceedings of the Staff Meetings of the Mayo Clinic, May 14, 1933.

convalescence was good and after eighteen days the patient left the hospital in good condition. A steady gain of weight was made and a state of good health was gotten. Such a case illustrates the difficulty of diagnosis and the importance of adequate search for the cause of persistent symptoms connected with the digestive tract.

Department of Clinical Education
OF THE MEDICAL SOCIETY OF VIRGINIA

Pediatric Clinics in Local Societies.

The response to letters addressed by the Chairman and Executive Secretary of the Department of Clinical Education to the larger local and regional societies, offering the cooperation of the Department and of the Pediatric Society of Virginia for the arrangement of programs emphasizing pediatric instruction, has been encouraging. Through their officers, the Medical Society of Northern Virginia and the Clinch Valley Medical Society have asked, and received, the assistance of the Department in suggesting suitable clinicians and in defraying the expense of their travel. The Lynchburg Academy of Medicine has appointed a committee to cooperate in the holding of a pediatric clinic and the Medical Society of Southwestern Virginia has taken the first steps through correspondence to give pediatrics a prominent place in its next program. The Norfolk County Society has reported that it will continue to emphasize pediatric clinics as in the past. The offer of members of the Pediatric Society of Virginia to assist in the arrangement of programs and clinics is supplemented by the desire of the Department of Clinical Education to use its resources for the furthering of this program. Instruction in pediatrics continues to be the outstanding need on the part of the practitioners of Virginia, as revealed by the great majority of the members of the classes in prenatal and postnatal care who wish to have the advantage of additional study in this subject.

R. D. Bates, *Chairman*,
Geo. W. Eutsler, *Executive Secretary*.

New Circuit of Courses in Prenatal and Postnatal Care.

Beginning the week of July 10th, Dr. Maxwell E. Lapham, Field Clinician of the Joint Committee on Prenatal and Postnatal Instruction, will have finished his work in part of Southwestern Virginia and will begin new classes in Tazewell, Lebanon, Bristol, Abingdon and Marion. The advance enrollment for this, the sixth circuit of centers for the study of prenatal and postnatal care, has already reached a total of forty-eight. The continued interest and activity of the several local committees have established the groups on a firm foundation and promise to conduct the courses in the most profitable manner.

Two interesting features of the new circuit are the desire of a second group of Tazewell County physicians for an additional center at Richlands, and the invitation of the director of a Bluefield, W. Va., clinic in prenatal care for the Tazewell County group to meet at the time of his clinic and take advantage of an abundance of clinical material. Both the additional class at Richlands and the visit to Bluefield are subject to the decision of the Tazewell Society's Committee and the arrangement of convenient schedules for members and instructor, who has already indicated his willingness to shift his schedule to make any special arrangements that will prove advantageous to the work.

The enrollments, committees and arrangements for the meetings in the sixth circuit are as follows:

Tazewell on Mondays, beginning July 10th, at 2:30 P. M. in the Court House. Total enrollments, 10. Local Committee: Chairman, Dr. P. D. Johnston, Drs. J. N. Higginbotham, J. P. Williams, H. B. Frazier and W. H. Ballard.

Lebanon on Tuesdays, beginning July 11th, at 2:00 P. M. in the Red Cross rooms. Total enrollments, 5. Local Committee: Chairman, Dr. R. F. Gillespie, Drs. P. J. Bundy and W. C. Elliott.

Bristol on Wednesdays, beginning July 12th, at 7:15 P. M., in King's Mountain Memorial Hospital. Total enrollments, 14. Local Committee: Chairman, Dr. W. K. Vance, Jr., Drs. T. R. Bowers, C. W. Fleenor and E. H. Hearst.

Abingdon on Thursdays, beginning July 13th, at 2:00 P M., in the Council Chamber of the Mayor's Office. Total enrollments, 11. Local Committee: None formally appointed, but Drs. L. F. Cosby, L. M. Hines, D. L. Kinsolving and R. L. Hillman undertook to inform their associates and help furnish clinical material.

Marion on Fridays, beginning July 14th, at 1:00 P. M., in the office of Dr. Z. V. Sherrill. Total enrollments, 8. Local Committee: Chairman, Dr. A. B. Graybeal, Drs. T. K. McKee and G. D. Pettit.

Favorable Showing of Dr. Lapham's Classes in Southwestern Virginia

The percentage of attendance of enrolled members of classes in prenatal and postnatal care, established in previous circuits in and around the larger cities, has been equalled by the five groups which Dr. Lapham has been visiting since May 1st. At each meeting, on the average, over three-fourths of the physicians enrolled have been present; or, to be exact, the percentage of attendance is 77.5. By comparison in respect to the ease and convenience of access to previous centers, the record established by these groups is especially encouraging. There is further encouragement in the fact that when a scheduled class at Gate City failed to materialize, the nucleus of that group joined with physicians in Kingsport, Tenn., to carry on the work, though three meetings were lost before the organization was effected. The leadership in establishing the Kingsport class was taken by Dr. T. T. McNeer, to whom the Joint Committee and the Field Clinician are indebted for a cordial cooperation which wiped off the record a temporary blot of a vacancy in the class schedule.

The especially fine attendance records of the physicians in the Fremont and Stonega groups are remarked with pride in their achievement. Fremont's attendance rate is 90 per cent, and the class has been especially active in utilizing Dr. Lapham's out-of-class services for instructional consultations. The Stonega group has an even higher record of attendance of 91.7 per cent. A tabular statement of the enrollment and attendance for the fifth circuit, which includes six meetings except for Kingsport, where only three had been held, follows:

	Enrolled		Visitors		Attendance	
	No.	Present	No.	Present	Average	Per Cent
Fremont	5	27	3	9	6.0	90.0
Norton	8	37	3	7	7.2	77.1
Stonega	8	44	5	14	9.7	91.7
Kingsport	4	8	8	13	7.0	66.7
Pennington Gap	11	48	-	--	8.0	72.7

George W. Eutsler,
Secretary Joint Committee.

Proceedings of Societies

The Northern Neck Medical Association

Held its semi-annual meeting at Heathsville, May 25th, with Dr. W. N. Chinn, of Hague, presiding. Very interesting papers were read by the following local men: Dr. R. L. Hudnall, "Diarrhoea and Dysentery in Children under Three Years of Age"; Dr. E. R. Moorman, "Paroxysmal Haemoglobinuria of a Syphilitic Origin," discussed by Dr. T. W. Murrell, of Richmond; Dr. R. E. Booker, "Acute Glomerular Nephritis in Children," discussed by Dr. J. H. Smith, of Richmond. There were a number of visiting doctors from Richmond and Fredericksburg and the following Richmond men read interesting and helpful papers: Dr. J. S. Horsley, Jr., "Sieve Graft"; Dr. Frank Johns, "Extra Uterine Pregnancy"; Dr. Wallace Gill, "Ocular Headaches"; Dr. T. E. Hughes, "Bronchoscopy and Esophagoscopy."

The following were elected as delegates to the State Society: Dr. B. H. B. Hubbard from Lancaster County; Dr. V. L. Litsinger from Richmond County; Dr. E. T. Ames from Westmoreland County; and Dr. R. E. Booker from Northumberland County.

The meeting adjourned to meet at Kilmarnock the fourth Thursday in October, 1933.

R. E. Booker,
Secretary.

The Fairfax County Medical Society

Met on May 11th at Fairfax. Dr. Lewis C. Ecker, of Washington, D. C., addressed the meeting on "Digitalis and the Heart." An interesting case report was presented by Dr. J. T. Jones, Herndon, Va. The meeting was

well attended and a fine dinner was served after adjournment.

A joint meeting of the Alexandria and Fairfax Medical Societies was held at the George Mason Hotel, Alexandria, Va., on the night of May 25th. "Cancer of the Skin," a new five reel film secured from the Journal of Cancer, was shown. A short film, "Man Against Microbe," completed the program. Thirty-eight physicians, among whom were several visitors from nearby counties, attended the meeting, following which a buffet supper was served.

A. L. Carson, Jr., M. D.
Sec'y Fairfax Co. Med. Soc.

The Norfolk County Medical Society,

At its annual meting on June 5th ,elected Dr. W. P. McDowell as president; Dr. C. Carroll Smith as vice-president, and re-elected Dr. Lockburn B. Scott as secretary-treasurer. All officers are of Norfolk. The election of Dr. Scott is for the thirteenth consecutive year.

At this meeting, delegates and alternates were also elected for the next meeting of the House of Delegates of the State Society in Lynchburg.

Amelia County Medical Society.

At a recent meeting of this Society, the following officers were elected: President, Dr. H. C. Rucker, Mattoax; vice-president, Dr. J. M. Habel, Jetersville; secretary-treasurer, Dr. James L. Hamner, Mannboro. Drs. Habel and Rucker were elected delegate and alternate, respectively, to the Lynchburg meeting of the State Society.

Arlington County Medical Society.

At a meeting of this Society held June 12th, the following officers were elected: President, Dr. W. C. Welburn, Ballston; and secretary-treasurer, Dr. R. N. Sutton, Clarendon. Dr. Welburn was also elected delegate to the meeting of the State Society in Lynchburg.

B. H. Swain,
Retiring Secretary.

Roanoke Academy of Medicine.

The regular monthly meeting of the Academy was held at the Shenandoah Hospital, Roanoke, Va., on June 5th, with the president, Dr. Frank A. Farmer, presiding. The meeting was turned over to Dr. T. J. Hughes, as chairman, and the following program was presented by the members of the Hospital staff:

Lateral Sinus Thrombosis—Drs. G. M. Maxwell and Ira Hurt.

Consecutive Perforations of Stomach by Peptic Ulcer—Dr. Frank Helvestine.

Case Report—Dr. L. G. Richards.

Schiller's Lugol Test as an Aid to the Early Diagnosis of Cervical Cancer—Dr. W. B. Huff.

Recent Drugs in Treatment of Diabetes Mellitus—Dr. P. A. Richards.

Delegates and alternates to the Lynchburg meeting of the State Society were elected at this time, following which the Academy adjourned for the summer months.

The Lynchburg Academy of Medicine,

Meeting in Lynchburg on June 5th, named its delegates and alternates to the State Society meeting to be held in that city in the Fall. At this meeting, Dr. F. R. Hopkins, Lynchburg, presented an interesting and instructive paper on "Diabetes in Childhood," especially stressing treatment. Dr. James Morrison is president and Dr. John Hundley, Jr., secretary.

The James City-New Kent Medical Society

Met at Toano, Va., June 1st. The meeting started with dinner at the hotel at 6:30 P. M. Dr. F. S. Johns, of Richmond, read a paper on the "Acute Abdomen," which was discussed by Dr. J. M. Hutcheson, also of Richmond. Other guests from Richmond were Dr. H. U. Stephenson and Dr. G. A. C. Jennings. Interesting case reports were given by Drs J. R. Parker and E. B. Kilby, members. Dr. J. R. Parker, of Providence Forge, is president, and Dr. L. V. Henderson, of Toano, is secretary.

News Notes

Finals of Virginia's Medical Schools.

Medical College of Virginia

At the Commencement exercises of the ninety-fifth session of the Medical College of Virginia, Richmond, on the evening of May 30th, eighty-seven were awarded diplomas as graduates in medicine, twenty-two in dentistry, twenty-five in pharmacy, seven as bachelors of

science in pharmacy, and twenty-three in nursing.

Graduates in medicine, with hospital appointments, are given below:

MEMORIAL HOSPITAL, RICHMOND—Drs. Ellis Osler Coleman,* Collierstown; Charles William Copenhaver,* Bristol; James Nicholas Dudley, Danville; Willis Fiske Evans, Richmond; David Samuel Garner,* Lewisetta; Fred Thomas Hauser, Winston-Salem, N. C.; Jesse Bruce Hopkins, Norfolk; Wyman Plato Starling,* Roseboro, N. C.; and John Overbey Watkins, Jr., South Boston.

JOHNSTON-WILLIS HOSPITAL, RICHMOND—Drs. John Gordon Bell, Covington; Mary Elizabeth Johnston, Tazewell; and Edwin Darracott Vaughan, Ashland.

RETREAT FOR THE SICK, RICHMOND—Drs. Robert Buckley, Richmond; Samuel Harry Justa, Richmond; and James William Phillips, Jr., Hilton Village.

STUART CIRCLE HOSPITAL, RICHMOND—Drs. Fielding Jason Crigler,* Madison; Jefferson Bishop Kiser,* Wise; and Edward Williamson Perkins, III, Petersburg.

ST. ELIZABETH'S HOSPITAL, RICHMOND—Dr. Hamilton Douglas Fitzpatrick,* East Radford.

ST LUKE'S HOSPITAL, RICHMOND—Dr. Malcolm Dewey Foster, Bertrand.

TUCKER SANATORIUM, RICHMOND—Dr. Bernard Candler Grigsby, Lebanon.

SHELTERING ARMS HOSPITAL, RICHMOND—Drs. Lawrence Paul Jones,* Jarratt, and Joseph Lee Kinzie, Salem.

LEWIS GALE HOSPITAL, ROANOKE—Dr. Stephen John Beeken, Christiansburg.

CITY HOSPITAL, LYNCHBURG—Dr. Paul Quincy Daniel, Athens, W. Va.

CENTRAL STATE HOSPITAL, PETERSBURG—Dr. Howard Lee Dean, Dinwiddie.

ST. VINCENT'S HOSPITAL, NORFOLK—Dr. James Spencer Dryden,* Jeffs, and Carroll Bracey Robertson,* Petersburg.

PROTESTANT HOSPITAL, NORFOLK—Dr. Joseph Bernard Jones,* Doswell.

U. S. MARINE HOSPITAL, NORFOLK—Dr. Hugh Lyon Clements, Wilkerson,* Petersburg.

JOHNSTON MEMORIAL CLINIC, ABINGDON—Drs. Andrew Shapiro, Petersburg, and Henry Bernard Showalter, Kenbridge.

CHESAPEAKE AND OHIO HOSPITAL, CLIFTON FORGE—Dr. Russell Bruce Smiley,* Salem.

BARONESS ERLANGER HOSPITAL, CHATTANOOGA, TENN.—Drs. Emory Hamlin Anderson, Richmond; Robert Harold Jones, Fairmont, W. Va.; and Sam Gilmore Saunders, South Hill.

GARFIELD MEMORIAL HOSPITAL, WASHINGTON, D. C.—Dr. Clarence Edward Arnette,* Saltville.

DISTRICT OF COLUMBIA HOSPITAL, WASHINGTON, D. C.—Dr. Joseph Alexander Robinson, King William.

GALLINGER MUNICIPAL HOSPITAL, WASHINGTON, D. C.—Dr. William Schnauffer, Jr., Brunswick, Md.

EMERGENCY HOSPITAL, WASHINGTON, D. C.—Dr. Nathan Sharove,* Richmond.

LUTHERAN HOSPITAL, ST. LOUIS, MO.—Dr. Will Henry Aufranc, Columbia, Mo.

ST. LOUIS UNIVERSITY HOSPITAL, ST. LOUIS, MO.—Dr. Channing Glenn,* Richmond.

WHITE CROSS HOSPITAL, COLUMBUS, OHIO—Drs. Louis Philip Bailey, Scottsburg, and Leland Coffey Brown,* Richmond.

GRANT MEMORIAL HOSPITAL, COLUMBUS, OHIO—Drs. Edgar Childrey, Jr., Dumbarton; James Brownlee Johnson, Jr., Keyser, W. Va.; and Victor Anthony Simiele, Norfolk.

BOSTON CITY HOSPITAL, BOSTON, MASS.—Dr. William McKenzie Bickers, Richmond.

WORCESTER STATE HOSPITAL, WORCESTER, MASS.—Dr. John Witherspoon Ervin, Morgantown, N. C.

HARBOR VIEW HOSPITAL SYSTEM, SEATTLE, WASH. — Dr. William Russell Bishop,* Galax.

STATE OF WISCONSIN GENERAL HOSPITAL, MADISON, WIS.—Drs. Francis Keith Bradford and James Thomas Green, Jr., both of Richmond.

GRADY HOSPITAL, ATLANTA, GA.—Dr. Ernest Perry Buxton, Jr., Richmond.

HUNTINGTON MEMORIAL HOSPITAL, HUNTINGTON, W. VA.—Dr. Joseph Willis Carney, Newport News.

CHESAPEAKE AND OHIO HOSPITAL, HUNTINGTON, W. VA.—Drs. Charles Spurgeon Duncan, Iron Gate; Robert Hough Jordan,* Staunton; and Ernest Edward McClellan, Ethel, W. Va.

CHARLESTON GENERAL HOSPITAL, CHARLESTON, W. VA.—Drs. Ona F. Mitchell,* Sugar Grove, W. Va., and Glenn Grey Perry, Thomasville, N. C.

MEMORIAL HOSPITAL, PRINCETON, W. VA.—Dr. Joel Hudson Smith, Athens, W. Va.

Norwood General Hospital, Birmingham, Ala.—Drs. John Berton Clement, Trenton, N. J., and Bruce William Mongle, Holston.

Tenn. Coal and Iron Ry. Hospital, Fairfield, Ala.—Dr. Courtney Smith Stickley, Stephens City.

Mercy Hospital, Altoona, Pa.—Dr. William Demetri Comess, Norfolk.

Pottsville Hospital, Pottsville, Pa.—Dr. Florence Elizabeth Hess, Philadelphia, Pa.

St. Vincent's Hospital, Erie, Pa.—Dr. Raymond B. Nutter, Jr., Enterprise, W. Va.

McKeesport Hospital, McKeesport, Pa.—Dr. Anthony Andrew Yurko, Hollidays Cove, W. Va.

St. Elizabeth Hospital, Elizabeth, N. J.—Drs. Gerard Vito Farinola, Brooklyn, N. Y., and Philip L. Wolgin, Elizabeth, N. J.

Jersey City Medical Center, Jersey City, N. J.—Dr. Upshur Higginbotham, Bluefield, W. Va.

Christ Hospital, Jersey City, N. J.—Dr. Paul Chester Pearson, Venter.

U. S. Marine Hospital Service—Dr. William Hyatt Gordon, Vista, Mo.

James Walker Memorial Hospital, Wilmington, N. C.—Dr. Paul Hogg,* Wicomico.

North Carolina Baptist Hospital, Winston-Salem, N. C.—Dr. Vernon Delmas Offutt, Romney, W. Va.

Norton Memorial Infirmary, Louisville, Ky.—Dr. Albert Fraser Lapsley, Richmond.

The Roosevelt Hospital, New York, N. Y.—Dr. Moses Hamilton McClintic, Hot Springs.

Trinity Hospital, Brooklyn, N. Y.—Dr. Irving Isadore Shure, Roanoke.

Metropolitan Hospital, New York, N. Y.—Dr. Alfred Steiner, Richmond.

U. S. Marine Hospital, Stapleton, Staten Island, N. Y.—Dr. Charles Whitfield Taylor,* Grifton, N. C.

Harper Hospital, Detroit, Mich.—Dr. George Anthony Moosey, Monongah, W. Va.

Municipal Hospital, San Juan, Porto Rico—Dr. Juan Mimoso Raspaldo, Caguas, P. R.

Hartford Municipal Hospital, Hartford, Conn.—Dr. George Frederic Salle,* Hallsboro.

Other graduates in this class are:

Dr. Robert Hyman Alterman, Richmond.

Dr. Rexford Alexander Burdette, Charleston, W. Va.

Dr. Pietro Virginius Caruso, Clarksburg, W. Va.

Dr. Samuel Francis Driver, Staunton.

Dr. Joseph Forrest Phillips, Newport News.

*These graduates received commission as First Lieutenants, Medical Section, in the Officers' Reserve Corps of the Army of the United States.

University of Virginia

Fifty-nine students of the University of Virginia received the degree of doctor of medicine at the commencement exercises on June 13th. For the first time in four years, the entire fourth year medical class was graduated. The following is a list of graduates with hospital appointments:

Univerity of Virginia Hospital, University—Drs. Charles Varner Amole, Greensboro, N. C.; Edwin Edmunds Barksdale, Sutherlin; William Grossmann, Petersburg; Rosser Noland Hillsman, Jr., Lynchburg; Joseph Martin Hitch, Jr., Laurel, Del.; Hulbert Christopher McCoy, University; Asher Richardson Payne, University; John A. Moorman Thompson, Stevensburg; Robert Irvine Trent, Wilcoe, W. Va.; Robert Beaton Turnbull, Lawrenceville; and Vernon Atwill Turner, Bristol.

University of Virginia, Department of Pharmacology, University—Dr. William Maryon Moir, Roanoke.

University of Virginia, Department of Pathology, University — Dr. James Karl Scott, Terra Alta, W. Va.

Grace Hospital, Richmond — Dr. William Bernard Carpenter, Unionville.

St. Elizabeth's Hospital, Richmond—Dr. Jethro Meriwether Hurt, Blackstone.

Norfolk Protestant Hospital, Norfolk—Dr. Gershon John Levin, Norfolk.

Post-Graduate Hospital, New York, N. Y.—Dr. Nathaniel Lewis Bosworth, Jr., Lexington, Ky.

St. Luke's Hospital, Bethlehem, Pa.—Dr. Hugh Roland Butt, Norfolk.

West Baltimore General Hospital, Baltimore, Md.—Dr. Alfred Joseph Coan, Portsmouth.

Union Memorial Hospital, Baltimore, Md.—Dr. Charles Henry Conley, Jr., Frederick, Md.; Coleman Carnegie Johnston, Lexington, Ky., and Ernest Thomas Upson, Vinton.

Bushwick Hospital, Brooklyn, N. Y.—Dr. Cesare Francis DeBiase, Brooklyn, N. Y.

Johns Hopkins Hospital, Baltimore, Md.—Dr. John Essary Dees, Lake Charles, La.

Peter Bent Brigham Hospital, Boston, Mass.—Drs. Edward Arthur Delarue, Jr., Rich-

mond, and Clayton Bernard Ethridge, Washington, D. C.

CHARITY HOSPITAL, NEW ORLEANS, LA.—Dr. Glassell Slaughter Fitz-Hugh, University.

UNIVERITY OF PENNSYLVANIA HOSPITAL, PHILADELPHIA, PA.—Dr. Harrison Fitzgerald Flippin, University.

ST. JOSEPH HOSPITAL, PHILADELPHIA, PA.—Dr. Harry Maurice Frieden, Norfolk.

CITY MEMORIAL HOSPITAL, WINSTON-SALEM, N. C.—Drs. Henry Hamilton Hammer, Narrows, and Edward Linden Kinney, Charlottesville.

VIRGINIA MASON CLINIC, SEATTLE, WASH.—Drs. Wallace Edgar Herrell, Marshall; John Bohannon Hozier, Norfolk, and John Watkins Trenis, Catlett.

LONG ISLAND COLLEGE HOSPITAL, NEW YORK, N. Y.—Dr. Frederick Matthews Jacobs, Roanoke.

DELAWARE HOSPITAL, WILMINGTON, DEL.—Dr. Robert Archer Goodwin Jones, Newport News.

CINCINNATI GENERAL HOSPITAL, CINCINNATI, OHIO—Drs. Walter LeRoy Kilby, Peola Mills, and Edgar Prentice McKinney, Nacogdoches, Texas.

CHRIST HOSPITAL, JERSEY CITY, N. J.—Dr. Gabriel Llull, Adjuntas, P. R.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHIDREN, BOSTON, MASS.—Dr. Eleanor Holman McCoy, Cambridge, Mass.

CITY HOSPITAL, CLEVELAND, OHIO—Dr. Charles Hampton Mauzy, Jr., Harrisonburg.

BALTIMORE CITY HOSPITAL, BALTIMORE, MD.—Drs. Thomas Andrew Moneymaker, Charleston, W. Va., and George Edward Waters, Blackstone.

STATE UNIVERSITY HOSPITAL, OKLAHOMA CITY, OKLA.—Dr. Harold George Nix, Opp, Ala.

EPISCOPAL HOSPITAL, PHILADELPHIA, PA.—Dr. Frederick Ralph Person, Williamsburg.

TOLEDO HOSPITAL, TOLEDO, OHIO—Dr. Jack Berry Porterfield, University.

ORANGE MEMORIAL HOSPITAL, ORANGE, N. J.—Dr. Charles Walton Purcell, Louisa.

LAKESIDE HOSPITAL, CLEVELAND, OHIO—Dr. William Alexander Read, Newport News.

MT. SINAI HOSPITAL, NEW YORK, N. Y.—Dr. Charles Wolfe Rieber, Rockaway Beach, N. Y.

GARFIELD MEMORIAL HOSPITAL, WASHINGTON, D. C.—Dr. John Adrian Sims, De Kalb, Ill.

MEDICAL CENTER, JERSEY CITY, N. J.—Dr. John Thompson Brown Strode, Amherst.

ST. FRANCIS HOSPITAL, TRENTON, N. J.—Dr. Herbert William Swertfeger, Carson.

CHURCH HOME AND INFIRMARY, BALTIMORE, MD.—Drs. George Nathaniel Thrift, Madison, and William Hoge Wood, Jr., Charlottesville.

LONG ISLAND HOSPITAL, BOSTON, MASS.—Dr. Algernon Keeling Turner, Danville.

ST. FRANCIS HOSPITAL, CHARLESTON, W. VA.—Dr. John Ernest Vaughan, Baywood.

TOURO INFIRMARY, NEW ORLEANS, LA.—Dr. Herman Weinberg, Staunton.

ST. JOSEPH'S HOSPITAL, BALTIMORE, MD.—Dr. James Edmond White, Norfolk.

Dr. Roger Gregory Magruder, Charlottesville, is also a graduate in this class.

Our Lynchburg Meeting.

The local committees have gotten actively to work in planning for the sixty-fourth annual meeting of the Medical Society of Virginia in Lynchburg, October 24th-26th. For information as to the meeting, members are requested to write chairmen of the various committees as listed in the June issue of the MONTHLY.

Cards have just been sent all members asking for titles of voluntary papers. The committee will use the rules adopted last year in the preparation of the program.

"Diseases of the Stomach" is the subject selected for the symposium. This will be divided as follows:

1. Physiology of the Stomach—Dr. W. R. Bond, Richmond.
2. Differential Diagnosis of Diseases of the Stomach—Dr. Blanton P. Seward, Roanoke.
3. Medical Treatment of Diseases of the Stomach—Dr. Alex. F. Robertson, Jr., Staunton.
4. Surgical Treatment of Diseases of the Stomach—Dr. C. Bruce Morton, University.

The general discussion which follows is to be opened by Dr. G. F. Simpson, of Purcellville and Dr. Wright Clarkson, of Petersburg.

Lynchburg and the surrounding country is at its loveliest in the Fall and the time for our meeting should be ideal for a vacation in that section. Make your plans to attend.

Several societies have reported names of delegates and alternates to the House of Delegates. We hope others will send their names

promptly as possible so we will have a full representation.

News Notes from the University of Virginia, Department of Medicine.

On May 3rd Dr. Henry B. Mulholland and Dr. William W. Waddell attended the meeting of the Augusta County Medical Society at Staunton. Dr. Mulholland addressed the Society on the subject of Treatment of Heart Disease and Dr. Waddell spoke on Diarrhea in Children.

On May 15th Dr. J. Edwin Wood spoke before the Rockingham County Medical Society on the subject of Digitalis.

On May 29th Dr. Lawrence T. Royster attended the meeting of the Norfolk County Medical Society in Norfolk and spoke on Rheumatism and the Rheumatic Heart in Children.

At the meeting of the University of Virginia Medical Society on May 22nd reports were given on various papers on the program of the recent sessions of the American Clinical Congress in Washington, by Drs. Lehman, Morton, Drash, Neff, Wood, Swineford, Wilson and Royster.

On May 26th Dr. Howard Kelly of the Johns Hopkins Medical School, gave a lecture before the Faculty and students on Some Personal Relationships with the History of Medicine within the Past Century.

Mr. Paul Goodloe McIntire, of Charlottesville, Va., has given the sum of $75,000.00 to the Medical School for the study and treatment of mental diseases and $100,000.00, as a memorial to his wife, Anna Rhodes McIntire, for the study and treatment of cancer.

At the meetings of the American Medical Association in Milwaukee, June 12th-16th, Dr. H. B. Mulholland presented a paper on Pellagra with Special Reference to Gastric Analysis; Dr. Oscar Swineford read a paper on Studies of the Anaphylactic Antibody; and Drs. D. C. Smith and W. A. Brumfield gave an exhibit on the Epidemiology of Syphilis.

News Notes from the Medical College of Virginia.

Dr. William deBerniere MacNider, Kenan Professor of Pharmacology, University of North Carolina Medical School, was awarded the honorary degree of doctor of science during the commencement exercises closing the ninety-fifth session of the Medical College of Virginia, Richmond, on Tuesday, May 30th.

Dr. Julian A. Burruss, President, Virginia Polytechnic Institute, was the commencement speaker at the final exercises of the Medical College of Virginia, Tuesday, May 30th. The combined graduating classes in medicine, dentistry, pharmacy, and nursing numbered 164.

During commencement week at the Medical College of Virginia, Richmond, portraits of Dr. Lewis Webb Chamberlayne, first professor of Materia Medica and Therapeutics, and Dr. Richard L. Bohannan, first professor of Obstetrics and Diseases of Women and Children, were unveiled. These portraits were gifts of the descendants of Dr. Chamberlayne and Dr. Bohannan. They occupy an interesting place in the Founders' Room of the new college library building.

Dr. Arthur D. Wright, President of the John F. Slater Fund, Washington, D. C., delivered the address at the tenth commencement of the Saint Philip Hospital school of nursing, which is under the Medical College of Virginia, Richmond. This school is maintained separately for the education of Negro nurses. There were twenty-one graduates in the class this year.

The third annual Saint Philip Hospital postgraduate clinic, conducted by the Medical College of Virginia, Richmond, at the large modern hospital maintained for the care of Negro patients, opened on June 19th to continue for two weeks. The course is designed for general practitioners and will be opened to the Negro physicians without restrictions as to residence. The class is limited to twenty-four.

News Notes from the Duke University School of Medicine and Duke Hospital.

On June 1st, Dr. George P. Muller, Professor of Clinical Surgery, at the University of Pennsylvania, Philadelphia, gave a clinic at the Duke Hospital on the Practice of Surgery.

At the graduating exercises held at Duke University June 7th, fifteen medical students

received the degree of Doctor of Medicine and four received the degree of Bachelor of Science in Medicine. At the same time, fourteen nurses received their diplomas in Nursing—this being the first class to graduate from the School of Nursing, and three students in the School of Dietetics received the degree of Bachelor of Science in Dietetics.

On June 10th the spring quarter of the medical school ended and the summer quarter commenced June 19th, with fifty students registered at Duke, for credit here, and three studying at other medical schools in this country, for which they will be given credit at this medical school. Several of the senior students, who are in their twelfth, or elective, quarter, will interne at various hospitals.

The American Psychiatric Association.

The 89th annual meeting of this Association was held May 29 to June 2, 1933, in Boston. Its program was replete with scientific and practical papers dealing with various phases of mental disorders, mental hygiene and allied subjects. The president, Dr. James V. May, who is commissioner of the Department of Mental Diseases of Massachusetts, opened the meeting with a strong and convincing address relative to maintaining the association in the highest possible plane of scientific psychiatry and in support of certain changes in its constitution, afterwards adopted, insuring the highest possible type of membership and scientific service. The Association met on certain days in joint session with the American Association for the Study of the Feebleminded and with the American Psycho-analytic Association. The Section on Convulsive Disorders held a meeting prior to the general sessions of the Psychiatric Association. One evening was given over to round table discussions devoted to management of problems of decreased support for state institutions; mental defectives in public and in private schools; parole and colony care of mental defectives; problems of criminality; psychiatric nursing; psychiatric social service; research in mental disorders; occupational therapy, and other topics.

Among the papers of a comprehensive nature was one on "Some Suggestions for the Future" (in the state care and treatment of the insane, etc.) by Dr. William A. White, Superintendent of the Government Hospital, at Washington, D. C., a nationally known authority and well known to the Virginia profession. It was formally discussed by Dr. William F. Drewry, of Richmond, Va. Another paper which should be of interest to many Virginians was one by Dr. John Joseph Kindred, of New York, but a native of Virginia, on "Some Medico-legal Considerations in Clinical and Civic Cases; Tests of Responsibility."—which was in part an analysis of the case of Zangara who shot Mayor Cermak, but who intended, it appears, to kill President Roosevelt. The paper was much discussed by psychiatrists having medico-legal tendencies. There were numerous other papers that had special significance, presented by some of the leading psychiatrists of the country, nearly all of which were formally discussed. All the papers will be published in the *American Journal of Psychiatry*.

The officers of the Association for the ensuing year are Dr. George H. Kirby, of New York, as president, whose native home was North Carolina, and whose father was at one time Superintendent of the State Hospital at Raleigh; and the new secretary is Dr. William C. Sandy, Harrisburg, Pa., Director of Mental Hygiene of Pennsylvania. Auditors—Drs. H. C. Henry, Petersburg, Va., Clarence M. Pierson, Pineville, La., and Paul G. Taddiken, Ogdensburg, N. Y. The new vice-president who becomes president a year later is Dr. Charles F. Williams Superintendent of the South Carolina State Hospital, Columbia, S. C. In this connection, other Southern psychiatrists have been president of the Association—Dr. Eugene Grissom, North Carolina; Dr. Theophilus O. Powell, Georgia, a native of Virginia; Dr. Robert J. Preston, Virginia; Dr. William F. Drewry, Virginia; Dr. James T. Searcy, Alabama.

The annual meeting in 1934 will be held in New York.

Virginia psychiatrists attending the meeting were Dr. J. H. Bell, Superintendent of the Virginia Colony for Epileptics and Feebleminded, Colony, Va.; Dr. William F. Drewry, Director of the Bureau of Mental Hygiene, State Department of Public Welfare, Richmond, Va., and Dr. H. C. Henry, Superintendent of the Central State Hospital, Petersburg, Va.

Married.

Dr. Robert Preston Hawkins, Jr., Clifton Forge, Va., and Miss Grace Vernon Reynolds, University, Va., on June 9th.

Dr. Garland Norfleet Carter, Bodyton, Va., and Miss Susan Elizabeth Carpenter, Richmond, Va., June 24th.

Dr. Charles Marsden Irvin, Roanoke, Va., and Miss Ruby Newman Hammer, Elkton, Va., June 1st.

Dr. Bernard Candler Grigsby, Lebanon, Va., of the class of '33, Medical College of Virginia, and Miss Mary Helen McKissick, Wellville, Va., July 12, 1932.

Dr. Henry Amiss Hornthal, Washington, D. C., and Miss Ellen Joanna Hall, May 13th.

Dr. Frederick Thomas Amiss and Miss Ruth Ann Broyles, both of Luray, Va., June 17th.

Dr. Russell Felts Hufford, Welch, W. Va., and Miss Mayme Eleanor Knight, Richmond, Va., June 17th. Dr. Hufford is a member of the class of '32, Medical College of Virginia.

American Medical Association.

At the eighty-fourth annual session of this Association held in Milwaukee, June 13th-16th, the following officers were elected: Dr. Dean Lewis, Baltimore, succeeded Dr. E. H. Cary, Dallas, as president; president-elect, Dr. Walter L. Bierring, Des Moines, Iowa; vice-president, Dr. John H. Musser, New Orleans, La.; secretary, Dr. Olin West, Chicago; and treasurer, Dr. Herman L. Kretschmer, Chicago.

Cleveland, Ohio, was selected as the place for the 1934 meeting.

There was a registered attendance of approximately 4,500 members. Of this number, the following twenty-six were from Virginia:

Dr. Howard Armstrong, Harrisonburg.
Dr. C. E. Conrad, Harrisonburg.
Dr. J. G. Davis, Jr., Christiansburg.
Dr. R. M. DeHart, Floyd.
Dr. James H. Deyerle, Harrisonburg.
Dr. Warren F. Draper, Richmond.
Dr. Harvey B. Haag, Richmond.
Dr. W. L. Harris, Norfolk.
Dr. Emory Hill, Richmond.
Dr. J Shelton Horsley, Richmond.
Dr. M. B. Jarman, Hot Springs.
Dr. Southgate Leigh, Norfolk.
Dr. W. Ambrose McGee, Richmond.
Dr. Ernest B. Miller, Elkton.
Dr. H. B. Mulholland, University.
Dr. R. L. Payne, Norfolk.
Dr. B. C. Shuler, Shenandoah.
Dr. Reuben F. Simms, Richmond.
Dr. Dudley C. Smith, University.
Dr. L. E. Stubbs, Newport News.
Dr. Oscar Swineford, Jr., University.
Dr. D. M. Thomasson, Lynchburg.
Dr. Warren T Vaughan, Richmond.
Dr. Fred J. Wampler, Richmond.
Dr. John S. Weitzel, Richmond.
Dr. T. J. Williams, University.

Dr. G. G. Crawford,

Strasburg, Va., has been elected one of the directors of the newly organized Rotary Club in that town.

The Alumni Association of the Medical College of Virgina,

At its annual meeting during commencement week at the College, elected Dr. John B. Fisher, of Midlothian, as president for the coming year. Dr. T. W. Wood (dentist) and Dr. H. H. Ware (physician), both of Richmond, were elected first and second vice-presidents, respectively, and Dr. F. H. Beadles, Richmond, was re-elected treasurer. The office of secretary is to be filled by appointment of the president.

A resolution of special interest adopted by the Association is to ask each member of the Association to give or raise during the coming year $10.00, to be devoted to fireproofing the Egyptian building and making it suitable for purposes of a medical college museum.

The Association referred to its officers the matter of designating a committee of seven to cooperate with a general committee of the College in planning for the proper observance of the centennial of the institution during the session of 1937-38.

Doctors in Politics.

In June elections, the following doctors were chosen to serve as members of their respective city councils: Drs. Percy Harris and L. R. Stinson, Scottsville, and Dr. H. S. Daniel, Louisa.

Dr. Warren T. Vaughan,

Richmond, Va., was elected secretary-treasurer of the Association for the Study of Allergy at its recent annual conference in Milwaukee.

Dr. Henry C. Davis,

Recently of Grundy, Va., has just located at Bluefield, Va., where he will continue his work in general practice.

Dr. Paul B. Barringer,

Charlottesville, Va., was the guest speaker at a recent meeting of the Richmond Chapter

of the University of Virginia Alumni Association.

Dr. W. R. Bond,

Professor of physicology at the Medical College of Virginia, Richmond, has been awarded the decoration of the Purple Heart by the United States War Department, in recognition of meritorious service in France during the World War.

Merck and Co., Inc.,

Of Rahway, N. J., has published a most attractive booklet to mark the occasion of the opening of their Research Laboratory, of which the formal dedication ceremonies took place on April 25th. In addition to illustrating and describing the laboratories, the booklet contains in full the principal address on "Academic and Industrial Research in the Field of Therapeutics" by Sir Henry Dale, Director of the National Institute for Medical Research, of London, England. It also contains excerpts from Mr. Merck's speech of welcome.

Dr. Wyndham Blanton Honored.

Dr. Wyndham B. Blanton, Richmond, Va., has been awarded the honorary degree of doctor of literature by Hampden-Sidney College, because of his splendid work in writing the "History of Medicine in Virginia." Two volumes have already been published and a third is nearing completion.

The Virginia, Maryland and District of Columbia Medical Society

At its Spring meeting on May 24th, in Alexandria, Va., elected the following officers: president—Dr. Frank J. Broschart, Gaithersburg, Md.; vice-president—Dr. C. C. Tumbleson, Sandy Spring, Md.; recording secretary—Dr. James A. Gannon, Washington, D. C.; corresponding secretary—Dr. A. Magruder MacDonald, Washington, D. C.; treasurer—Dr. Robert Scott Lamb, Washington, D. C.

Interesting papers were presented by Drs. Oscar Hunter, Wm. B. Herbst, Lyle Mason, S. B. Moore, Wm. Thornwall Davis, and D. Percy Hickling.

Through the unanimous adoption of a special resolution, Dr. D. Kerfoot Shute, of Washington, was elected to honorary membership.

Dr. Eugene S. Groseclose,

Who has been located at University, Va., since his graduation from University of Virginia in 1929, has moved to Lynchburg, Va., and has offices in Allied Arts Building. His work is limited to obstetrics and gynecology.

Dr. Ira L. Hancock,

Of the class of '31, Medical College of Virginia, after a residency at St. Vincent's Hospital, Norfolk, Va., has located at Creeds, Va., for the practice of medicine.

The Medical Association of the Valley of Virginia

Met at Clifton Forge on May 25th with Dr. H. Grant Preston, president, presiding. Dr. M. Pierce Rucker, of Richmond, was guest of honor at this meeting and read a paper on "A Discussion of Painless Childbirth." Other papers were presented by Drs. M. J. Payne, Staunton; N. M. Canter, Harrisonburg; H. G. Preston, Harrisonburg; John B. McKee, Winchester; and R. P. Hawkins, Jr., Clifton Forge.

The next meeting of this Association will be held in Winchester, September 28th. Dr. Alexander F. Robertson, Jr., is secretary.

The Virginia Society of Oto-Laryngology and Ophthalmology

Met in Harrisonburg, May 6th. Interesting scientific papers were presented at this time, and the following officers elected: President, Dr. H. Grant Preston, Harrisonburg; vice-president, Dr. Meade Edmunds, Petersburg; and secretary-treasurer, Dr. Edwin W. Burton, Charlottesville.

The next meeting will be held in Lynchburg, the date to be named later.

The West Virginia State Medical Association,

At its annual meeting in Charleston, in May, elected Dr. Roy Ben Miller, of Parkersburg, as president for 1934. Dr. Albert G. Rutherford, Welch, and Dr. G. H. Barksdale, Charleston, were elected vice-presidents, and Dr. T. M. Barber, Charleston, was re-elected treasurer. Mr. Joe W. Savage, Charleston, is secretary. Huntington was selected as the 1934 place of meeting.

Dr. A. W. Armentrout,

Recently of Winchester, Va., has located at Martinsburg, W. Va., where he is connected with the staff of the King's Daughters' Hospital in that place and is engaged in the practice of surgery.

Dr. John P. Snead, Jr.,

Of the class of '32, University of Virginia, Department of Medicine, who has just com-

pleted a residency at Johnston Memorial Clinic, Abingdon, Va., has located for practice at Sperryville, Va.

Dr. Luedde Awarded Leslie Dana Gold Medal.

The Leslie Dana Gold Medal, awarded annually for the most outstanding achievements in the prevention of blindness and the conservation of vision, was presented in June to Dr. William H. Luedde, director of the department of ophthalmology in the St. Louis University School of Medicine.

Dr. Luedde was selected for this honor by the National Society for the Prevention of Blindness in cooperation with the Missouri Association for the Blind, through whom the medal is offered annually by Mr. Leslie Dana, of St. Louis. The conditions of the award set forth that it is to be made for "long meritorious service for the conservation of vision in the prevention and cure of diseases dangerous to eyesight; research and instruction in ophthalmology and allied subjects; social service for the control of eye diseases; and special discoveries in the domain of general science or medicine of exceptional importance in conservation of vision."

North Carolina State Medical Society.

At its annual meeting in April, Dr. Isaac H. Manning, Chapel Hill, was installed as president and Dr. Paul P. McCain, Sanatorium, was chosen president-elect. Dr. L. B. McBrayer, Southern Pines, is secretary of the Society. Pinehurst was selected as the next place of meeting, the dates to be May 30-June 2, 1934.

Dr. H. A. Tabb,

Gloucester, Va., has ben elected president of the Country Club of Gloucester, Va., for the coming year.

Dr. L. E. Walton,

Recently of New Marker, Va., announces his removal to Pullman, W. Va.

Dr. Micajah Boland,

Commander (M. C.) U. S. Navy, has been transferred from the Naval Training Station, Great Lakes, Ill., to the Navy Yard, Portsmouth, Va., effective July 1st. He is a native of Virginia and an alumnus of the University of Virginia, Department of Medicine.

Dr. Douglas Vanderhoof,

Richmond, Va., was unanimously elected president of the Richmond Community Fund, on May 31st, to fill the unexpired term of Mr. Alexander W. Weddell, recently appointed ambassador to the Argentine Republic.

The Medical Society of the District of Columbia,

At its meeting on May 3rd, elected the following officers for the year beginning July 1st: President, Dr. Prentiss Willson; vice-presidents, Drs. Daniel L. Borden and Margaret M. Nicholson; secretary-treasurer, Dr. Coursen B. Conklin (re-elected). All officers are located in Washington.

The Southside Virginia Medical Association

Held its regular quarterly meeting at LaCrosse, Va., June 13th. The program was as follows: "The Etiology, Diagnosis and Medical Treatment of Pyelitis"—Dr. Kinloch Nelson, Richmond; "Pyelitis and its Relation to Anomalies of the Urinary Tract in Children"—Dr. A. S. Hurt, Jr., Richmond; "The X-Ray in the Diagnosis and Treatment in Kidney Diseases"—Dr. Allen Barker, Petersburg; "The Cystoscope in Diagnosis and Treatment of Diseases of the Genito-Urinary Tract"—Dr. W. T. Gay, Suffolk; and "Surgery of the Kidneys"—Dr. Herbert Jones, Petersburg.

The reception committee, composed of Drs. W. W. Wilkinson, C. V. Montgomery, L. H. Bracey and W. L. Varn, arranged a pleasant meeting and gave a barbecue dinner preceding the meeting.

The Chalmers Gold Medal,

Awarded by the Royal Society of Tropical Medicine and Hygiene of England, was presented to Dr. Saul Adler, Professor of Parasitology at the Hebrew University, at the annual meeting in England of the Council of the Royal Society on June 15th. As Director of the Kala-Azar Commission of the Royal Society for 1930-32, Dr. Adler undertook researches in Italy and Malta under the joint auspices of the Hebrew University and the Royal Society, in the tropical diseases in which he is said to have done outstanding work.

Dr. E. V. Valz,

Commander in the U. S. Navy, recently stationed at Marine Barracks, Paris Island, S. C., has been transferred to the U. S. S. Nevada, San Pedro, Calif. Dr. Valz is an alumnus

of the University of Virginia, Department of Medicine, and has been a member of the Medical Society of Virginia for a number of years.

Dr. William P. Gilmer,

Clifton Forge, Va., was recently elected first vice-chairman of the local chapter of the American Red Cross.

Dr. Martin D. Delaney, Jr.,

Located on July 1st in the office of his father, the late Dr. M. D. Delaney, at 618 Cameron Street, Alexandria, Va., for the general practice of medicine and surgery. He received his M. D. degree from Georgetown University, Washington, D. C., in 1932, and has just completed a year's rotating service in the Georgetown University Hospital.

Dr. Ramon D. Garcin,

Richmond, Va., was re-elected a member of the School Board of this city for a new term, effective July 1st.

The National Society for the Prevention of Blindness

Observed its twenty-fifth anniversary on May 24th. When the Society was first organized it had a membership of only ten men and women but now has 16,600 members throughout the United States.

The greatest achievement of the Society has been in the field of ophthalmia neonatorum. Complete eradication of this source of blindness is regarded as scientifically possible.

There were two "sight-saving" classes organized in 1913, and this number has grown to 421. Fifteen new classes were organized in 1932.

Dr. Harry J. Warthen, Jr.,

Of the class of '25, University of Virginia, Department of Medicine, has returned to his home in Richmond, Va., after a seven months' stay in the New Surgical Clinic of Freiburg, Germany, where he was engaged in clinical and experimental work. He also visited surgical clinics in Central Europe, England and Scotland during his European trip.

For Sale.

One Wappler X-ray and Fluoroscope, complete with tank, picture and therapy tubes new.

One Dark Field Illuminator, new, Bausch and Lomb.

One Therapeutic Lamp on stand, 1500 watts.

One Edmond Electric Baker, 6 globes.

Address inquiries to No. 392, care this journal, 1200 East Clay Street, Richmond, Va. (*Adv.*)

Obituary Record

Dr. Emmette Edward Walker,

For a number of years a resident of Pamplin, Va., died at his home in that place on June 9th, after a long illness. He was a native of Mecklenburg County, Virginia, and 63 years of age. Upon completion of his academic education, Dr. Walker entered the former University College of Medicine of Richmond, Va., and received his medical degree from this school in 1900. He had been a member of the Medical Society of Virginia since the following year. His wife and two daughters survive him.

Dr. John Cleveland Philips,

Portsmouth, Va., died recently after a short illness. He was 48 years of age and a graduate from the Maryland Medical College, Baltimore, in 1912. Dr. Phillips was a native of Georgia but had resided in Portsmouth since 1912. He had been city physician for fourteen years and was a member of the Norfolk County Medical Society. His wife and an adopted daughter survive him.

Dr. John Williams Brown

Died suddenly at his home in Hampton, Va., June 11th. He was 59 years of age and received his degree of medicine from the University of Virginia in 1899. Dr. Brown was a Mason. He is survived by a brother and sister.

Dr. John Chalmers Da Costa,

Samuel D. Gross professor of Surgery at Jefferson Medical College, Philadelphia, died at his home in that city on May 16th, after a long illness. He was seventy years of age and had been connected with the faculty of Jefferson Medical College for nearly forty-five years. He was a surgeon and medical writer of international note.

Dr. Julian Davis Arbuckle,

Of Lewisburg, W. Va., died of heart disease on May 3rd. He was 57 years of age and a graduate of the former University College of Medicine, Richmond, Va., in 1901. Dr. Arbuckle is survived by seven children.